COST MODEL
MICHIGAN SMALL BUS SPECIFICATION
18 Passenger Nonlift Bus – Lift Bus With Alternate Seating

Body Manufacturer: ElDorado National Inc.
Vendor Name Hoekstra Transportation, Inc.
Vendor Address 3741 Roger B. Chaffee Blvd.
Grand Rapids, MI 49548

VENDOR SIGNATURE:

I. COST MODEL

Quantity			Unit Price	Total
		Passenger seats with vinyl seat covers		
16 Ea	A.	18 passenger bus without lift	37,758.00	604,128.00
28 Ea	B.	11+1 passenger bus with front active lift	42,401.00	1,187,228.00
18 Ea	C.	8+2 passenger bus with front active lift	42,988.00	773,784.00
10 Ea	D.	11+1 passenger bus with rear active lift	42,846.00	428,460.00
8 Ea	E.	4+2 passenger bus with rear active lift	44,449.00	355,592.00
		Passenger seats with fabric seat covers		
9 Ea	F.	18 passenger bus without lift	38,328.00	344,952.00
15 Ea	G.	11+1 passenger bus with front active lift	42,881.00	643,215.00
10 Ea	H.	8+2 passenger bus with front active lift	43,378.00	433,780.00
6 Ea	I.	11+1 passenger bus with rear active lift	43,326.00	259,956.00
5 Ea	J.	4+2 passenger bus with rear active lift	45,019.00	225,095.00
	K.	Options – Alternate Quote Prices		
60 Ea	1a.	Air Conditioning System skirt mount	3,650.00	219,000.00
55 Ea	1b.	Air Conditioning System roof mount	4,150.00	228,250.00
60 Ea	2.	Manual entrance door (deduct)	(245.00)	(14,750.00)
60 Ea	3.	Diesel engine 6.0l, minimum	4,735.00	284,100.00
30 Ea	4a.	Auxiliary air heater system – gas	1,750.00	52,500.00
10 Ea	4b.	Auxiliary air heater system - diesel	1,750.00	17,500.00
15 Ea	5.	Power base for driver's seat	415.00	6,225.00
5 Ea	6.	Destination sign	1,000.00	5,000.00
5 Ea	7.	Ceiling Handrails	400.00	2,000.00
60 Ea	8.	Engine shutdown system	460.00	27,600.00
25 Ea	9.	Donation box	(750.00)	(18,750.00)
25 Ea	10.	Farebox Electrical Prep	(865.00)	(21,625.00)
25 Ea	11.	Rear emergency exit window	(555.00)	(13,875.00)
10 Ea	12a.	Paint OEM white no stripe (deduct)	(200.00)	(2,000.00)
10 Ea	12b.	Extra 10" stripe, each	200.00	2,000.00
10 Ea	12c.	Roof painted a second color	200.00	2,000.00
10 Ea	12d.	Full body paint	925.00	9,250.00
20 Ea	13.	Folding Platform Active Lift	225.00	4,500.00
25 Ea	14.	Rear five place passenger seat	171.00	4,275.00
20 Ea	15.	Two-way radio prep package	210.00	4,200.00
25 Ea	16.	Smooth Anti-slip Flooring	360.00	9,000.00
10 Ea	17.	Entrance Stepwell heater	250.00	2,500.00

TOTAL EVALUATION PRICE OF A, B, C, D, E, F, G, H, I, J, AND K ABOVE $6,066,840.00

Michigan Inspection Facility Hoekstra Transportation, Inc.
Address of Inspection Facility: 3741 Roger B. Chaffee Blvd.
Grand Rapids, MI 49548

EVALUATION FORM

Size, Material Type, and Model Bid

II. BODY SPECIFICATIONS

A.	General design and construction	Fiberglass reinforced plastic body integrated with stainless steel window assembly and steel reinforced construction for secure attachment points. Body is built on the Ford E-450 Commercial Chassis
B.	Body structure and exterior panels	
1.	Rollover frame, steel cage type	N/A
1a.	Body section thickness	
2.	Fiberglass composite type	Interlocked resin saturated fiberglass mattin and mechanical fasteners, forming a unibody design. Matrix of fiberglass reinforced plastic with an inner thickness of resin-hardened honeycomb material. Also includes Nidacore (plastic honeycomb) around all opeinings (i.e. windows, roof hatches etc.)
2a.	Body section thickness	Exterior surface: 020" minimum high gloss gelcoat backed by 3/16" minimum thickness resin-hardened fiberglass reinforced plastic. The center composite is 3/4" resin-hardened matrix of honeycomb and nidacore laid on edge for maximum column strength of each cell. Steel sections are fully integrated into wall and roof structure to insure additional structural integrity and attachement points for stanchions and handrails. Final surface is a minimum 3/16" thickness of fiberglass reinforced plastic.
3.	Exterior panels	See 2a, Complete Discription Of All Layers
4.	Interior panels	Fibrglass Reinforced Panels - As Specified
5.	Interior length	155.50 and 175.50
6.	Interior width	90.50"
7.	Interior height	80"
8.	Exterior length	255.88" and 275.88"
9.	Exterior width	96" , Excluding Exterior Rear View Mirrors
10.	Exterior height	112" Excluding Roof Hatch & Strobe Light
11.	Rubrails	ENC - 1 1/2" Rubber In Plastic Molding
12.	Body overhang	69" and 92"
C.	Passenger door	Vapor Door Control W/Removable Cover For Maximum Accessability To Controls
1.	Opening size	32"
D.	Stepwell – Material	14 Gauges 304 Stainless Steel - Complete
E.	Interior, Material, Color	Laminated FRP, white gelcoat
F.	Flooring	Subfloor - Marine grade plywood, undercoated before and after installation onto steel floor structure. RCA Floor covering.
G.	Emergency exits	Transpec Roof Hatch, Pushout Windows, Rear Door or Window as specified
H.	Gauges	Ford OEM, as specified
I.	Fare box	Main M2 W/2 Vaults
J.	Bumpers	Ford OEM - Front / Romeo Rim Inc (Help Bumper - Rear
K.	Mud flaps	Commercial grade anti-sail with stainless steel brackets

L.	Towing		Rear Tow Hooks Only
M.	1.	Undercoating	Tectyl 121B
	2.	Rustproofing	Zinc Chromate and Waxoyl Interior of all tube type steel
N.	1.	Interior mirrors	As Specified
	2.	Sunvisors	Ford OEM
O.	Exterior mirrors		Heated Only - Mirrorlite
P.	Seats		
	1.	Driver	ENC - OEM Freedman Reclining/Lumbar Support/Arm Rest
	2.	Passenger	Freedman, as specified
	3.	Fold up	Freedman, as specified
Q.	Handrails, stanchions		ENC OEM, Yellow Powder Coat As Specified
R.	Interior lighting		ENC OEM, As Specfied & Reviewed At Pilot Build
S.	Exterior lighting		Grote
T.	Safety equipment		As Specified
U.	Heating / ventilating		
	1.	Front System	Ford OEM
	2.	Rear System	Pro Air
V.	Windows		Kinro 41H X 29W, Stainless Steel Sub Assembly
W.	Paint		Sikkens
X.	Insulation		ENC OEM Construction
Y.	Lift (platform type), active		Braun Century CL 917, full

			Size, Material Type, and Model Bid
III.	WHEELCHAIR SECUREMENT AREA		
A.	Wheelchair securement		Q'Straint Q5-6100-FDP Flanged W/End Caps Mounted 54" Minimum
B.	Wheelchair restraints		Q' Straint Model Q 8100
C.	Restraint storage		Q'Straint Storage Pouch, Determine Location At Pilot
IV.	CHASSIS SPECIFICATIONS		
A.	Chassis		Ford E450 Super Duty
B.	Tilt wheel/power steering		Ford OEM
C.	Wheelbase		158"
D.	Engine – gasoline		6.8 V-10 Ford OEM
E.	Transmission		4 Speed Automatic W/Overdrive (4R100)
F.	Alignment		ENC - prior to shipment is recommended, units are driven over 800 miles without alignment if done at our location. Hoekstra Transportation will provide the alignment if this is prfered by the State
G.	Gross Vehicle Weight Rating (GVWR)		14,050 Lbs.
	1.	Front axle rating	4,600 Lbs
	2.	Rear axle rating	9,450 Lbs
H.	Differential		Ratio 4.63
I.	Battery		Ford OEM

J.	Alternator	
	1. Gasoline	Leece Neville 200 Amp If Ford offers dual 110 amps on the gasoline in the future ENC will change to the Ford OEM dual 110 Alternators.
	2. Diesel	Dual Ford Alternator (110 Amp Per)
K.	Engine fast idle control	Intermotive Products Gateway AI - both gasoline and diesel units
L.	Grounds	Ford OEM & ENC OEM as specified, reviewed at pre production and finalized with MDOT & ENC Electrical at pilot build. ENC / HTI will add grounds as needed.
M.	Brakes	Ford OEM
N.	Fuel tank	Ford OEM 55 Gallon
O.	Hazard flashers	Ford OEM (Steering) ENC OEM Push/Pull Type - Location At Pre Production or Pilot
P.	Shock absorbers	Ford OEM
Q.	Springs	Ford OEM
	1. Front	Ford OEM
	2. Rear	Mor/Ryde Suspension
R.	Stabilizer	Ford OEM
S.	Wheels	Ford OEM
T.	Tires	Ford OEM
U.	Drive shaft	Ford OEM
V.	Wipers / Horn	Ford OEM
W.	Radiator and cooling system	Ford OEM
X.	Fluids	Ford OEM
Y.	Engine Cover	Ford OEM
Z.	Exhaust system	Form OEM / Extension To Street Side ENC OEM

V. OTHER ITEMS

A.	Safety	
	1. Reverse alarm	Ecco Model 510SG
	2. Rear door alarm	ENC OEM
	3. Lift master switch and light	ENC OEM (RC Tronics)
	4. Lift door open indicator	ENC OEM (RC Tronics)
	5. Lift interlock	ENC OEM (RC Tronics)
	6. Headlight Control	Ford OEM
	7. Strobe Light	Grote

		Size, Material Type, and Model Bid
B.	Electrical	
	1. Lift circuit breaker	Braun
	2. Wire coding and harness	Complete plug and play harness, each harness is taged for function, each wire is color coded and stamped every 6 inches. Harness function tag stays on all harenesses if used or not
	3. Master rotary switch	ENC OEM
	4. Electrical panel	RC Tronics
	5. Wiring support	As Specified

6.	Wiring grounds and capacity	Two main grounds to chassis frame at front and back of bus, all other ground go back to RC Tronics panel and are spread evenly on ground bar.
7.	Constant run solenoid	ENC OEM - As Specified
8.	Accessory master switch	ENC OEM - As Specified
9.	Wiring protection	ENC OEM
10.	Wiring routing	ENC OEM
11.	Wiring connections	Weather-Pak Plug & Play

VI. OPTIONS – ALTERNATE QUOTES

A.	Air conditioning system	
1.	Option A	American Cooling Technologies (ACT) 50T
2.	Option B	AC Industries AC-517T
B.	Manual entrance door	ENC OEM
C.	Diesel engine 6.0l minimum	Ford OEM 6.0 Diesel, Ford OEM Dual Alternators, Espar Coolant Heater
D.	Auxiliary air heater system	
1.	Gas	Espar
2.	Diesel	Espar
E.	Power seat base for driver's seat	Ford OEM
F.	Destination sign	Transign
G.	Ceiling Handrails	ENC OEM
H.	Engine shutdown system	Murphy
I.	Donation Box	Main Model DM1
J.	Farebox Electrical Prep	ENC OEM
K.	Rear emergency exit window	Kinro
L.	Folding platform active lift	Braun Vista VL 917
M.	Rear five place passenger seat	Freedman
N.	Two way radio prep package	ENC OEM
O.	Smooth anti-slip flooring	Altro Meta 2.2
P.	Entrance stepwell heater	Electric Lighthouse - RCA Flooring and Hot Water On Altro Flooring (Option)

The following option is listed for information only. IF the option is available please indicate An approximate installed price.

		Available				Price
A.	Natural Gas Application (CNG or LNG)	YES	X	NO		28,865.00

VII. VENDOR/MANUFACTURER REQUIREMENTS

A.	Vehicle information furnished	As Specified (Chassis Manuls Ship Direct)
B.	Manufacturer quality control (name/title)	Richard (Chief) Coffman Quality Control Mgr
		Ford QVM Certification, ISO 9000:2001 Certification, and Quality Control Plan Included In Proposal
C.	Air conditioning certification	As Specified/Required
D.	Heating/Ventilating certification	As Specified/Required
E.	Purchaser inspection	Per MDOT/State of Michigan/Ordering Agency
F.	Warranty	Per Specification Requirements - No Exceptions
G.	Miscellaneous	
1.	Turning radius wheel to wheel	27.72
2.	Turning radius wall to wall	28.51

VIII. BID DOCUMENTS

- A. Completed Michigan Bus Specification Forms
- B. Vehicle floor plans
- C. Wheelchair lifts manufacturer' specifications
- D. Entrance door and door opening device design
- E. Entrance step configuration design
- F. Manufacture's chassis description
- G. Body, chassis, and drive train warranties
- H. Bus Rollover Protection Test (FMVSS 220) Certification
- I. Federal Transit Administration (FTA) clauses
- J. Seat covering material flammability and smoke data
- K. Seat frame salt spray test data
- L. Seat and seat belt certification
- M. Roof, sidewalls, and flooring drawings
- N. Body to chassis frame mounting
- O. Wiring and switch certification
- P. Dealer Agreement
- Q. Bus Testing Certification

Bidder Comments:

1. Hoekstra Transportation Inc. does not take any exceptions nor request any deviations or approved equals.
2. Above pricing includes the $1,000.00 credit for Ford Mobility on all lift units.
3. Above pricing includes a Ford Government Price Concession credit of $5,300.00 per unit.
4. Above pricing is firm for two years per the request for bid, we are purchasing the units through a Ford dealer "production units" and not using the ElDorado National Ford Pool - this will result in estimated deliveries of 180 days from order.
5. Hoekstra Transportation Inc. can offer delivery of "out of production" from the ElDorado National Ford Pool in 90 days from date of order, this is based on chassis availalbility (only a concern at year end build out) and the units may not be equipped with Daytime Running Lights. The charge for this will be $1,780.00 per unit, this is firm for the two year contract.
6. Please note that the units proposed include the new electrical system/panel as reviewed at the Higgins Lake Maintenance Seminar, complete plug and play automotive type wiring harness, the Vapor door control, and the steel window framing will be complete stainless steel to mention a few of the ElDorado National improvments.

ATTACHMENT A - FTA CLAUSES (ROLLING STOCK)

Required FTA clauses - Please return copies of these pages with your bids. Fill in parts 1, 5, 6, 7, and 20.

1. **Buy America Requirements**

The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 CFR Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7, and include final assembly in the United States for 15 passenger vans and 15 passenger wagons produced by Chrysler Corporation, microcomputer equipment, software, and small purchases (currently less than $100,000) made with capital, operating, or planning funds. Separate requirements for rolling stock are set out at 5323(j)(2)(C) and 49 CFR 661.11. Rolling stock not subject to a general waiver must be manufactured in the United States and have a 60 percent domestic content.

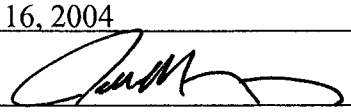
A bidder or offeror must submit to the FTA recipient the appropriate Buy America certification (below) with all bids on FTA-funded contacts, except those subject to a general waiver. Bids or offers that are not accompanied by a completed Buy America certification must be rejected as nonresponsive. This requirement does not apply to lower tier subcontractors.

Certification requirement for procurement of steel, iron, or manufactured products.

Certificate of Compliance with 49 U.S.C. 5323(j)(1)

The bidder or offeror hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j)(1) and the applicable regulations in 49 CFR Part 661.

Date June 16, 2004

Signature 

Company Name ElDorado National-KS, Inc.

Title Contract Administrator

Certificate of Non-Compliance with 49 U.S.C. 5323(j)(1)

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(1), but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(B) or (j)(2)(D) and the regulations in 49 CFR 661.7.

Date _____

Signature _____

Company Name _____

Title _____

Certification requirement for procurement of buses, or rolling stock and associated equipment.

Certificate of Compliance with 49 U.S.C. 5323(j)(2)(C).

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and the regulations at 49 CFR Part 661.

Date June 16, 2004

Signature 

Company Name ElDorado National-KS, Inc.

Title Contract Administrator

Certificate of Non-Compliance with 49 U.S.C. 5323(j)(2)(C)

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(2)(C), but may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(B) or (j)(2)(D) and the regulations in 49 CFR 661.7.

Date _____

Signature _____

Company Name _____

Title _____

2. **Cargo Preference Requirements** 46 U.S.C. 1241/ 46 CFR Part 381

The Contractor agrees:

a. to use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels;

b. to furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the contractor in the case of a subcontractor's bill-of -lading.)

c. to include these requirements in all subcontracts issued pursuant to this contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

3. **Energy Conservation Requirements** 42 U.S.C. 6321 et seq./ 49 CFR Part 18

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

4. **Clean Water Requirements** 33 U.S.C. 1251

(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

(2) The Contractor agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FTA.

5. **Bus Testing** 49 U.S.C. 5323(c)/ 49 CFR Part 665

The Contractor [Manufacturer] agrees to comply with 49 U.S.C. § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 and shall perform the following:

(1) A manufacturer of a new bus model or a bus produced with a major change in components or configuration shall provide a copy of the final test report to the recipient at a point in the procurement process specified by the recipient which will be prior to the recipient's final acceptance of the first vehicle.

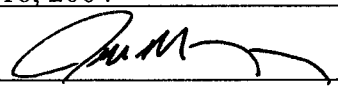
(2) A manufacturer who releases a report under paragraph 1 above shall provide notice to the operator of the testing facility that the report is available to the public.
(3) If the manufacturer represents that the vehicle was previously tested, the vehicle being sold should have the identical configuration and major components as the vehicle in the test report, which must be provided to the recipient prior to recipient's final acceptance of the first vehicle. If the configuration or components are not identical, the manufacturer shall provide a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing.
(4) If the manufacturer represents that the vehicle is "grand fathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), the manufacturer shall provide the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

Certification of Compliance with FTA's Bus Testing Requirements

The undersigned [Contractor/Manufacturer] certifies that the vehicle offered in this procurement complies with 49 U.S.C. § 5323(c) and FTA's implementing regulation at 49 CFR Part 665.

The undersigned understands that misrepresenting the testing status of a vehicle acquired with Federal financial assistance may subject the undersigned to civil penalties as outlined in the Department of Transportation's regulation on Program Fraud Civil Remedies, 49 CFR Part 31. In addition, the undersigned understands that FTA may suspend or debar a manufacturer under the procedures in 49 CFR Part 29.

Date June 16, 2004

Signature 

Company Name ElDorado National-KS, Inc.

Title Contract Administrator

6. **Pre-Award and Post Delivery Audits Requirements** 49 U.S.C. 5323/ 49 CFR Part 663

The Contractor agrees to comply with 49 U.S.C. § 5323(1) and FTA's implementing regulation at 49 CFR Part 663 and to submit the following certifications:
(1) Buy America Requirements: The Contractor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If the Bidder/Offeror certifies compliance with Buy America, it shall submit documentation which lists
1) component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and 2) the location of the final assembly point and the cost of final assembly.
(2) Solicitation Specification Requirements: The Contractor shall submit evidence that it will be capable of meeting the bid specifications.

(3) Federal Motor Vehicle Safety Standards (FMVSS): The Contractor shall submit 1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or 2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

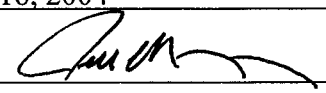
BUY AMERICA CERTIFICATE OF COMPLIANCE WITH FTA REQUIREMENTS FOR BUSES, OTHER ROLLING STOCK, OR ASSOCIATED EQUIPMENT

(To be submitted with a bid or offer exceeding the small purchase threshold for Federal assistance programs, currently set at $100,000.)

Certificate of Compliance

The bidder hereby certifies that it will comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C), Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 CFR 611.11:

Date June 16, 2004

Signature 

Company Name ElDorado National-KS, Inc.

Title Contract Administrator

Certification of Non-Compliance

The bidder hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C) and Section 165(b)(2) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirements consistent with 49 U.S.C. Sections 5323(j)(2)(B) or (j)(2)(D), Sections 165(b)(2) or (b)(4) of the Surface Transportation Assistance Act, as amended, and regulations in 49 CFR 661.7.

Date _____

Signature _____

Company Name _____

Title _____

7. **Lobbying** 31 U.S.C. 1352/ 49 CFR Part 19/ 49 CFR Part 20

Contractors who apply or bid for an award of $100,000 or more shall file the certification required by 49 CFR part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded form tier to tier up to the recipient.

APPENDIX A, 49 CFR PART 20--CERTIFICATE REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperatives Agreements

(To be submitted with each bid or offer exceeding $100,000)

The undersigned [Contractor] certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form---LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restriction on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*)]

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure or failure.]

The Contractor, ElDorado National-KS, Inc., certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. § 3801, *et seq.*, *apply* to this certification and disclosure, if any.

Signature of Contractor's Authorized Official

Jeff Montgomery, Contract Administrator Name and Title of Contractor's Authorized Official

June 16, 2004 Date

8. **Access to Records** 49 U.S.C. 5325/ 18 CFR 18.36/ 49 CFR 633.17

The following access to records requirements apply to this Contract:

1. Where the Purchaser is not a State but a local government and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 CFR 18.36(I), the Contractor agrees to provide the Purchaser, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 CFR 633.17 to provide the FTA Administrator or his authorized representatives including any PMO Contractor access to Contractor's records and construction sites pertaining to major capital project, defined at 49 U.S.C. 5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311.
2. Where the Purchaser is a State and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 CFR 633.17, Contractor agrees to provide the Purchaser, the FTA Administrator or his authorized representatives, including any PMO Contractor, access to the Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309, 5311. By definition, a major capital project excludes contracts of less than the simplified acquisition threshold currently set at $100,000.
3. Where the Purchaser enters into a negotiated contract for other than a small purchase or under the simplified acquisition threshold and is an institution of higher education, an hospital or other non-profit organization and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 CFR 19.48, Contractor agrees to provide the Purchaser, FTA Administrator, the Comptroller General of the United States or any of their duly authorized representatives with access to any books, documents, papers and record of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions.
4. Where any Purchaser which is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 U.S.C. 5325(a) enters into a contract for a capital project or improvement (defined at 49 U.S.C. 5325(a)1) through other than competitive bidding, the Contractor shall make available records related to the contract to the Purchaser, the Secretary of Transportation and the Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and inspection.

5. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
6. The Contractor agrees to maintain all books, records, accounts and reports required under this contract for a period of not less than three years after the date of termination or expiration of this contract, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case Contractor agrees to maintain same until the Purchaser, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(I)(11).

9. **Federal Changes** 49 CFR Part 18
Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Agreement (Form FTA MA (3) dated October, 1996) between Purchaser and FTA, as they may be amended or promulgated from time to time during the term of this contract. Contractor's failure to comply shall constitute a material breach of this contract.

10. **Clean Air** 42 U.S.C. 7401 et seq/ 40 CFR 15.61/ 49 CFR Part 18
(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.
(2) The Contractor also agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FTA.

11. **Recycled Products** 42 U.S.C. 6962/ 40 CFR Part 247/ Executive Order 12873
The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

12. **Contract Work Hours and Safety Standards Act** 40 U.S.C. §§ 327-333 (1995)/ 29 CFR § 5 (1995)/ 29 CFR § 1926 (1995)
(1) **Overtime requirements**. No contractor or subcontractor for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of overtime wages required by the clause set forth in paragraph (1) of this section.

(3) **Withholding for unpaid wages and liquidated damages.** The State of Michigan shall be upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

(4) **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this section.

(5) **Payrolls and basic records.** (a) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions make and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

Section 107 (OSHA):
(This section is applicable to construction contracts only)
Contract Work Hours and Safety Standards Act. (i) The Contractor agrees to comply with section 107 of the Contract Work Hours and Safety Standards Act, 40 U.S.C. section 333, and applicable DOL regulations, "Safety and Health Regulations for Construction" 29 CFR Part 1926. Among other things, the Contractor agrees that it will not require any laborer or mechanic to work in unsanitary, hazardous, or dangerous surroundings or working conditions.
(ii) Subcontracts. The Contractor also agrees to include the requirements of this section in each subcontract. The term "subcontract" under this section is considered to refer to a person who agrees to perform any part of the labor or material requirements of a contract for construction, alteration or repair. A person who undertakes to perform a portion of a contract involving the furnishing of supplies or materials will be considered a "subcontractor" under this section if the work in question involves the performance of construction work and is to be performed: (1) directly on or near the construction site, or (2) by the employer for the specific project on a customized basis. Thus, a supplier of materials which will become an integral part of the construction is a "subcontractor" if the supplier fabricates or assembles the goods or materials in question specifically for the construction project and the work involved may be said to be construction activity. If the goods or materials in question are ordinarily sold to other customers from regular inventory, the suppliers not a "subcontractor." The requirements of this section do not apply to contracts or subcontracts for the purchase of supplies or materials or articles normally available on the open market.

13. **Program Fraud and False or Fraudulent Statements or Related Acts** 31 U.S.C. 3801 et seq/ 49 CFR Part 31/ 18 U.S.C. 1001/ 49 U.S.C. 5307
(1) The contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. §§3801 et seq. and U.S. Dot regulations, "Program Fraud Civil Remedies," 49 CFR Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.
(2) The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. §5307, the Government reserves the right to impose the penalties of 18 U.S.C. §1001 and 49 U.S.C. §5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.
(3) The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

14. **Termination** 49 U.S.C. Part 18/ FTA Circular 4220.1D

a. Termination for Convenience (General Provision) The State of Michigan may terminate this contract, in whole or in part, at any time by written notice to the Contractor when it is in the Government's best interest. The Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination. The Contractor shall promptly submit its termination claim to the State of Michigan to be paid to the Contractor. If the Contractor has any property in its possession belonging to the State of Michigan, the Contractor will account for the same, and dispose of it in the manner the State of Michigan directs.

b. Termination for Default [Breach or Clause] (General Provision) If the Contractor does not deliver supplies in accordance with the contract delivery schedule, or, if the contract is for services, the Contractor fails to perform in the manner called for in the contract, or if the Contractor fails to comply with any other provisions of the contract, the State of Michigan may terminate this contract for default. Termination shall be effected by serving a notice of termination on the contractor setting forth the manner in which the Contractor is in default. The contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner of performance set forth in the contract.

c. Opportunity to Cure (General Provision) The State of Michigan in its sole discretion may, in the case of a termination for breach or default, allow the Contractor [an appropriately short period of time] in which to cure the defect. In such case, the notice of termination will state the time period in which cure is permitted and other appropriate conditions.

If the Contractor fails to remedy to the State of Michigan's satisfaction the breach or default or any of the terms, covenants, or conditions of this Contract within [ten (10) days] after receipt by Contractor or written notice from the State of Michigan setting forth the nature of said breach or default, the State of Michigan shall have the right to terminate the Contract without any further obligation to the Contractor. Any such termination for default shall not in any way operate to preclude the State of Michigan form also pursuing all available remedies against the contractor and its sureties for said breach or default.

d. Waiver of Remedies for any Breach In the event that the State of Michigan elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such waiver by the State of Michigan shall not limit the State of Michigan's remedies for any succeeding breach of that or of any other term, covenant, or condition of the Contract.

e. Termination for Convenience (Professional or Transit Service Contracts) The State of Michigan, by written notice, may terminate this contract, in whole or in part, when it is in the Government's interest. If this contract is terminated, the Recipient shall be liable only for payment under the payment provisions of this contract for services rendered before the effective date of termination.

f. Termination for Default (Supplies and Services) If the Contractor fails to deliver supplies or to perform the services within the time specified in this contract or any extension or if the Contractor fails to comply with any other provisions of this contract, the State of Michigan may terminate this contract for default. The State of Michigan shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of the default. The Contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner or performance set forth in this contract.

g. Termination for Default (Transportation Services) If the Contractor fails to pick up the commodities or to perform the services, including delivery services, within the time specified in this contract or any extension or if the Contractor fails to comply with any other provisions of this contract, the State of Michigan may terminate this contract for default. The State of Michigan shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of default. The Contractor will only be paid the contract price for services performed in accordance with the manner of performance set forth in this contract. If this contract is terminated while the Contractor has possession of Recipient goods, the Contractor shall, upon direction of the State of Michigan, protect and preserve the goods until surrendered to the Recipient or its agent. The Contractor and The State of Michigan shall agree on payment for the preservation and protection of goods. Failure to agree on an amount will be resolved under the Dispute clause.

h. Termination for Default (Construction) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract or any extension or fails to complete the work within this time, or if the Contractor fails to comply with any other provisions of this contract, the State of Michigan may terminate this contract for default. The State of Michigan shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of the default. In the event, the Recipient may take over the work and compete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any work within specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Recipient in completing the work.. The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause if-

1. the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include: acts of God, acts of the Recipient, acts of another Contractor in the performance of a contract with the Recipient, epidemics, quarantine restrictions, strikes, freight embargoes; and
2. the contractor, with [10] days from the beginning of any delay, notifies the State of Michigan in writing of the causes of delay. If in the judgment of the State of Michigan, the delay is excusable, the time for completing the work shall be extended. The judgement of the State of Michigan shall be final and conclusive on the parties, but subject to appeal under the Disputes clauses.

i. Termination for Convenience or Default (Architect or Engineering) The State of Michigan may terminate this contract in whole or in part, for the Recipient's convenience or because of the failure of the Contractor to fulfill the contract obligations. The State of Michigan shall terminate by delivering to the Contractor a Notice of Termination specifying the nature, extent, and effective date of the termination. Upon receipt of the notice, the Contractor shall (1) immediately discontinue all services affected (unless the notice directs otherwise), and (2) deliver to the Contracting Officer all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this contract, whether completed or in process.

If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Recipient.

j. Termination for Convenience of Default (Cost-Type Contracts) The State of Michigan may terminate this contract, or any portion of it, by serving a notice of termination on the Contractor. The notice shall state whether the termination is for convenience of the State of Michigan or for the default of the Contractor . If the termination is for default, the notice shall state the manner in which the contractor has failed to perform the requirements of the contract. The Contractor shall account for any property in its possession paid for from funds received form the State of Michigan, or property supplied to the Contractor by the State of Michigan. If the termination is for default, the State of Michigan may fix the fee, if the contract provides for a fee, to be paid the contractor in proportion to the value, if any, of work performed up to the time of termination. The Contractor shall promptly submit its termination claim to the State of Michigan and the parties shall negotiate the termination settlement to be paid to the Contractor. If the termination is for the convenience of the State of Michigan, the Contractor shall be paid its contract close-out costs, and a fee, if the contract provided for payment of a fee, in proportion to the work performed up to the time of termination.

15. **Government wide Debarment and Suspension (nonprocurement)** 49 CFR Part 29/ Executive Order 12549
Certification Regarding Debarment, Suspension, and Other Responsibility Matters-Lower Tier Covered Transactions (Third Party contracts over $100,000)

Instructions for Certification

1. By signing and submitting this bid or proposal, the prospective lower tier participant is providing the signed certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, The State of Michigan may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the State of Michigan if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "persons," "principle," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549 [49 CFR Part 29]. you may contact the State of Michigan for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized in writing by the State of Michigan.

6. **The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction", without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.**
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded form the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List issued by U.S. General Service Administration.
8. Nothing contained in the foregoing shall be construed to require establishment of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under Paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to all remedies available to the Federal Government, The State of Michigan may pursue available remedies including suspension and/or debarment.

"Certification Regarding Debarment, Suspension Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction"

(1) The prospective lower tier participant certifies, by submission of this bid or proposal, that neither it nor its "principals" [as defined at 49 CFR § 29.105(p)] is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
(2) When the prospective lower tier participant is unable to certify to the statements in this certification, such prospective participant shall attach an explanation to this proposal.

16. **Privacy Act Requirements** 5 U.S.C. 552
The following requirements apply to the Contractor and its employees that administer any system of records on behalf of the Federal Government under any contract:
(1) The Contractor agrees to comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. § 552a. Among other things, the Contractor agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Contractor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying contract.
(2) The Contractor also agrees to include these requirements in each subcontract to administer any system of records on behalf of the Federal Government financed in whole or in part with Federal assistance provided by FTA.

17. **Civil Right Requirements** 29 U.S.C. 623/ 42 U.S.C. 2000/ 42 U.S.C. 6102/ 42 U.S.C. 12112/ 42 U.S.C. 12132/ 49 U.S.C. 5332/ 29 CFR Part 1630/ 41 CFR Parts 60 *et seq.* The following requirements apply to the underlying contract:

(1) Nondiscrimination. In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal Transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.
(2) Equal Employment Opportunity. The following equal employment opportunity requirements apply to the underlying contract:
(a) Race, Color, Creed, National Origin, Sex. In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 5332, the Contractor agrees to comply with all applicable equal opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 CFR Parts 60 *et seq.*, (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.
(b) Age. In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. §§ 623 and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.
(c) Disabilities. In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 CFR Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.
(3) The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

18. **Breaches and Dispute Resolution** 49 CFR Part 18/ FTA Circular 4220.1D

Disputes. Disputes arising in the performance of this Contract which are not resolved by agreement of the parties shall be decided in writing by the authorized representative of the State of Michigan. This decision shall be final and conclusive unless within ten (10) days from the date of receipt of its copy, the Contractor mails or otherwise furnishes a written appeal to the State of Michigan. In connection with any such appeal, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the State of Michigan shall be binding upon the Contractor and the Contractor shall abide be the decision.

Performance During Dispute. Unless otherwise directed by the State of Michigan, Contractor shall continue performance under this Contract while matters in dispute are being resolved.

Claims for Damages. Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the party or of any of his employees, agents or others for whose acts he is legally liable, a claim for damages therefor shall be made in writing to such other party within a reasonable time after the first observance of such injury of damage.

Remedies. Unless this contract provides otherwise, all claims, counterclaims, disputes and other matters in question between the State of Michigan and the Contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the State in which the State of Michigan is located.

Rights and Remedies. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the State of Michigan or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

19. **Transit Employee Protective Agreements** 49 U.S.C. 5310, 5311, and 5333/ 29 CFR Part 215

(1) The Contractor agrees to comply with applicable transit employee protective requirements as follows:

(a) General Transit Employee Protective Requirements. To the extent that FTA determines that transit operations are involved, the Contractor agrees to carry out the transit operations work on the underlying contract in compliance with terms and conditions determined by the U.S. Secretary of Labor to be fair and equitable to protect the interests of employee employed under this contract and to meet the employee protective requirements of 49 U.S.C. § 5333(b), and U.S. DOL guidelines at 29 CFR Part 215, and any amendments thereto. These terms and conditions are identified in the letter of certification from the U.S. DOL to FTA applicable to the FTA Recipient's project from which Federal assistance is provided to support work on the underlying contract. The Contractor agrees to carry out that work in compliance work on the underlying contract. The Contractor agrees to carry out that work in compliance with the conditions stated in that U.S. DOL letter. The requirements of this subsection (1), however, do not apply to any contract financed with Federal assistance provided by FTA either for projects for elderly individuals and individuals with disabilities authorized by

49 U.S.C. § 5310(a)(2), or for projects for nonurbanized areas authorized by 49 U.S.C. § 5311. Alternate provisions for those projects are set forth in subsections (b) and (c) of this clause.

(b) Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5310(a)(2) for Elderly Individuals and Individuals with Disabilities. If the contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5310(a)(2), and if the U.S. Secretary of Transportation has determined or determines in the future that the employee protective requirements of 49 U.S.C. § 5333(b) are necessary or appropriate for the state and the public body subrecipient for which work is performed on the underlying contract, the Contractor agrees to carry out the Project in compliance with the terms and conditions determined by the U.S. Secretary of Labor to meet the requirements of 49 U.S.C. § 5333(b), U.S. DOL guidelines at 29 CFR Part 215, and any amendments thereto. These terms and conditions are identified in the U.S. DOL's letter of certification to FTA, the date of which is set forth Grant Agreement or Cooperative Agreement with the state. The Contractor agrees to perform transit operations in connection with the underlying contract in compliance with the conditions stated in the U.S. DOL letter.

(c) Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5311 in Nonurbanized Areas. If the contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5311, the Contractor agrees to comply with the terms and conditions of the Special Warranty for the Nonurbanized Area Program agreed to by the U.S. Secretaries of Transportation and Labor, dated May 31, 1979, and the procedures implemented by U.S. DOL or any revision thereto.

(2) The Contractor also agrees to include any applicable requirements in each subcontract involving transit operations financed in whole or in part with Federal assistance provided by FTA.

20. **Disadvantaged Business Enterprise (DBE) Provision** 49 CFR Part 26

a. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The requirements of 49 CFR, Part 26 and the Michigan Department of Transportation's (M-DOT) U.S. DOT approved Disadvantaged Business Enterprises (DBE) program (where required) are incorporated in this contract by reference. Failure by the contractor or subcontractor to carry out these requirements is a material breach of the contract, which may result in the termination of this contract or such other remedy as M-DOT deems appropriate.

b. This procurement is subject to the provisions of Section 26.49 of 49 CFR, Part 26. Accordingly, as a condition of permission to bid, the following certification must be completed and submitted with the bid. A bid which does not include certification may not be considered.

TRANSIT VEHICLE MANUFACTURER CERTIFICATION

ElDorado National-KS, Inc. (Name of Firm), a TVM, hereby certifies that it has complied with the requirement of Section 26.49 of 49 CFR, Part 26 by submitting a current annual DBE goal to FTA. The goals apply to Federal Fiscal Year 2004 (October 1, 2004 to September 30, 2004) and have been approved or not disapproved by FTA.

Hoekstra Transportation (Name of Firm), hereby certifies that the

manufacturer of the transit vehicle to be supplied ElDorado National-KS, Inc. (Name of Manufacturer) has complied with the above referenced requirement of Section 26.49 of 49 CFR Part 26.

Signature: _____ Date: June 16, 2004

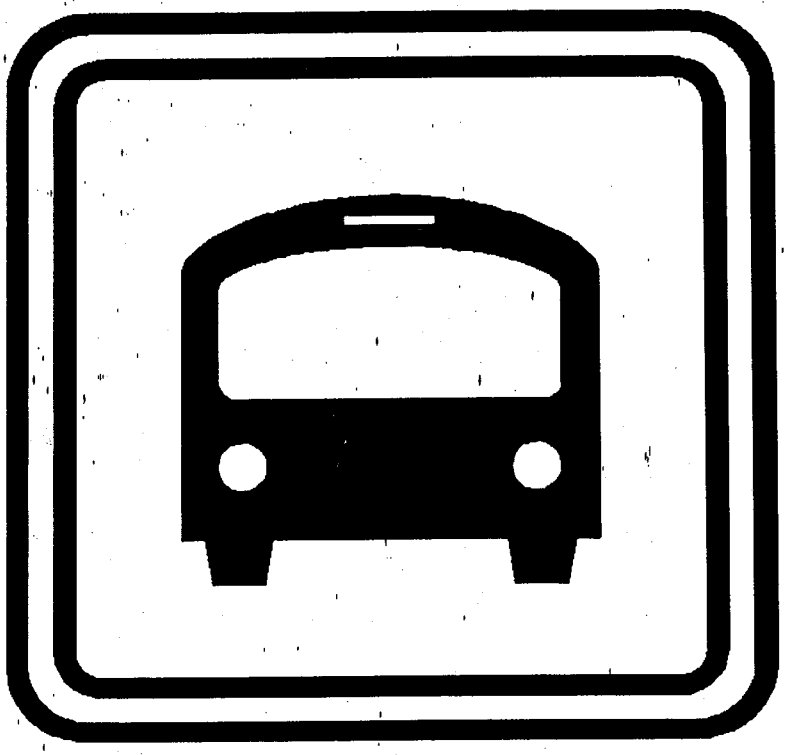
Title: Contract Administrator

Firm: ElDorado National-KS, Inc.

21. **Incorporation of Federal Transit Administration (FTA) Terms FTA Circular 4220.1D**
The preceding provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1D, dated April 15, 1996, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any of the State of Michigan requests which would cause the State of Michigan to be in violation of the FTA terms and conditions.

22. **No Government Obligation to Third Parties**
(1) The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.
(2) The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. Is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

STATE 0F MICHIGAN
PUBLIC TRANSPORTATION



SMALL BUS SPECIFICATIONS
18 Passenger Nonlift bus - Lift bus with Alternate Seating
2004-2006

MDOT
Michigan Department of Transportation

MULTI MODAL TRANSPORTATION SERVICES BUREAU
PASSENGER TRANSPORTATION DIVISION

REVISED 06-01-2004

STATE OF MICHIGAN
Small Bus Specifications
SPECIFICATIONS

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STATE OF MICHIGAN
SPECIFICATIONS
18-PASSENGER NON-LIFT SMALL BUS AND LIFT BUS WITH ALTERNATE SEATING

I. PURPOSE OF SPECIFICATIONS

These specifications are setting forth the minimum requirements for a two-axle, transit class commercial non-lift bus or Paratransit type commercial bus equipped with a commercial wheelchair lift. The body shall be mounted on a commercial or recreational vehicle (RV) chassis. The small bus must be capable of meeting all seating requirements (see Section X. Bus Seating Requirements). It shall be fully tested at the Penn State bus test facility in Altoona, Pennsylvania to Federal Transit Administration [FTA] minimum service life category of 5-years/150,000 miles. As a minimum, vehicles must meet all applicable Michigan Motor Carrier Vehicle Codes, all applicable Federal Motor Vehicle Safety Standards (FMVSS) and the Americans with Disabilities Act (ADA).

Any successful bidder supplying these vehicles shall quick title and deliver the vehicle and the title to the location specified by the State of Michigan, Multi-Modal Transportation Services Bureau. Chassis serial number, body number, axle ratio, gross vehicle weight rating (GVWR), seating capacity and paint codes shall be imprinted on a permanent decal or stamped on a metal plate and affixed in the driver's area of the vehicle (location to be approved by the State).

The bidder shall have a factory dealer with repair facilities and personnel in Michigan or the bidder may be a factory dealer with repair facilities (including a bus lift) and personnel in Michigan. Any in-state facility shall be capable of handling final inspection and corrections required by the State prior to acceptance of the buses after a contract is awarded. A copy of the dealer agreement between the Bus Manufacturer and the designated dealer will be required as part of the bid. Also, repair facilities shall be established throughout the State to provide chassis and body service support to transit agencies to minimize agency travel to reach the nearest repair facility. The successful bidder must be capable of providing parts and service for a period of seven years after the buses have been placed in service throughout the State of Michigan. The successful bidder must be able to supply body replacement parts within 5 working days of a request by a transit agency unless the bidder notifies the transit agency that the part is not available for shipment and provides the shipping date when the part will be available.

Regardless of options and seating plan ordered, the successful bidder shall be responsible for certifying that all vehicles delivered: 1) shall not exceed 95% of front spring and 95% of rear spring capacity rating at ground without exceeding GVWR of chassis as bid (determined by engineering calculated loaded vehicle axle weights), and 2) single wheelchair securement area buses shall not exceed 21' 11" in length measured bumper to bumper excluding the energy absorbing portion of the bumper (distance of travel allowed for compression of the bumper without body deformation). Manufacturers shall comply with the chassis company's quality vehicle manufacturing program such as Ford's Quality Vehicle Modifier (QVM).

In these specifications any required approvals shall be made by the State. Wherever brand, manufacturer, or product names are used, they are included only for the purpose of establishing a description of minimum quality of the item. This inclusion is not to be construed as advocating or prescribing the use of any particular brand or item or product. For this bid a pre-bid meeting will be scheduled to consider approved equals and exceptions to the bid specifications. A written response will be made for all bidders prior to the bid due date. The State must be able to determine whether the bidder's offered product is or is not equal to the product described in the specifications from information (technical data, test results, and the like) contained in the bid or provided at the pre-bid meeting. All detailed descriptions and specifications provided in the bid must match the product offered for use in the bid.

II. BODY SPECIFICATIONS

A. General Design and Construction

SAFETY: The chassis and body shall be designed using only prudent, proven engineering principles with all work performed only by professional established firms. The vehicle purchased shall comply with all State regulations and requirements applicable to the design and manufacture of motor vehicles for the State of Michigan.

DRIVER SIZE and COMFORT: Design criteria of bus purchased shall be for all females from the 5th percentile, to males of the 95th percentile, to be equally as comfortable in using all controls required to safely drive and maneuver the bus. All driver controls shall comply with FMVSS 101, with hand and foot controls required to operate the vehicle safely, including the placement of exterior \adjustable mirrors, positioned to meet this safety requirement.

QUALITY of WORKMANSHIP: All labor employed in both the manufacturing and assembly processes of the vehicle purchased shall be to the highest industry standards. The entire vehicle shall be within all established engineering tolerances set by all partles involved in the design and production of the bus. All added components shall be installed and positioned according to the component manufacturer's installation procedures which shall be available upon request.

WELDING: All welding procedures used throughout the construction of the vehicle (including materials, qualifications and training of personnel) shall be in accordance with the standards of the American Society for Testing and Materials (ASTM) and the American Welding Society (AWS). Contact surfaces of all material to be welded shall be clean, and free of grease, paint, rust and scale. After welding, all rough edges and surfaces on parts shall be ground smooth and coated with a corrosion inhibiting primer and paint.

ATTACHMENT HARDWARE: All rivets, screws, bolts, nuts, washers and / or other types of fasteners used in the construction process shall be of appropriate size and strength rating for the application. They shall be sprayed with or dipped in a rust-resistant coating material, be plated, be stainless steel, or otherwise be made of rust-resistant type material all of which will pass the 1000 hour ASTM D117 Salt Spray test and the 1000 hour ASTM D2247 Humidity Resistance test. Fasteners used by the respective component manufacturers in their assemblies are acceptable as part of the assembly.

B. Body Structure and Exterior Panels

All steel used in the body and floor structure shall be stored out of the elements to prevent early corrosion.

1. Metal Rollover Frame, Cage-type Construction

a. The bus shall have a heavy-duty, unit-body structure type. The body structure (rollover frame, cage type of gage #16 steel, 0.060" or equal, minimum) shall be of durable steel or aluminum construction, and adequately reinforced at all joints and points of stress, with sufficient strength to comply with the FMVSS 220 rollover protection test. All body and floor structural members (tubes, channels, etc.) shall be Gas Metal Arc Welded (GMAC) or equal at each joint. Each bidder shall provide certification with the bid that the bus, as bid, meets the FMVSS 220 rollover protection test (see Section VIII).

b. The bus shall be designed to withstand road shocks, stop and start operations, seasonal weather and road extremes, and other conditions found in Michigan transit bus service. The body shall be securely fastened to the chassis frame structure using a method of uniform attachment consisting of strategically placed rubber isolators/cushions with connector bolts that permit body flexing independent of chassis flexing. Roof, side, front, and back panels shall be secured to the body vertical and horizontal frame members, and these, when fastened to the floor structural members, result in a permanent, fully-integrated structural unit adequately reinforced at all points where stress concentration may occur. The body floor sub-frame assembly, including lower skirt reinforcements, shall be gage number 14 (.075" thickness) minimum galvanized steel (mill applied), gage number 16 stainless steel, gage number 12 aluminum, or cold or hot rolled steel with corrosion resistant coating, each of which shall have equal mechanical and corrosion resistance properties as gage number 14 galvanized steel as a minimum. Wheelwells shall have minimum yield strength of gage number 14 (.075" thickness) galvanized steel, gage number 16 (.060" thickness) stainless steel, or gage number 12 (.10" thickness) aluminum properly welded or secured with approved corrosion resistant fasteners to the floor structure. The entire body cage and frame including floor structure shall be properly coated with a corrosion resistant coating or a non -water permeable primer/paint. All box type tubing used in the floor structure shall have the interior of the tube coated with corrosion resistant material as outlined in Rustproofing/Undercoating Section II., M. All components treated to resist corrosion shall be properly cleaned to remove greases, oils, and residues before application of the corrosion resistant material. Passage holes provided for wiring and hoses shall be thoroughly sealed to prevent dust and moisture intrusion and be sufficiently protected to ensure against wear from friction and the elements. When completed, all body side sections and roof sections including structure shall be at a minimum 1¼" thick. Where body segments are joined they shall be properly sealed to prevent intrusion of drafts, fumes, dust, and water to the interior of the bus body.

c. All exterior side and roof panel material shall be gage number 20 (.035 thickness) galvanealed steel, or metal of equal mechanical properties, minimum. If fiberglass, it shall have as a minimum, the mechanical properties equal to gage number 20 (.035" thickness) steel according to American Society of Mechanical Engineers (ASME) industry standards and must have State approval. The corners, transitions, front panels, and other locations requiring additional strength shall use steel or other metal with mechanical properties to match the structural integrity requirements. Reinforcements shall be installed around all window openings in order to transfer stress around the opening. All door openings shall have full structural framing (tube) or imbedded reinforcements equal to the structural members of the body that will adequately support concentrations of stress around openings. All exposed door frame structure shall be made of 304 stainless steel, acid-etched, coated with zinc based primer and powder coated OEM white (including the fasteners). Where a stiffener or a backer material (substrate) is used for the exterior panels, it shall be bonded with waterproof adhesive to the exterior panel; it shall be a water resistant material that will not wick water; and it must be thoroughly sealed from the elements when installed so that the substrate will not be exposed to or absorb moisture and cause corrosion to the interior of the panel or any body structure. Exterior panel substrate shall not be of wood composition, plywood or a pressed wood product. Where body segments are joined they shall be properly sealed to prevent intrusion of drafts, fumes, dust, and water to the interior of the bus body.

d. All interior panels may be made of scuff-resistant vinyl-coated aluminum, textured paint on steel, or laminate/FRP finished material. Molded ABS may be used as trim but not for interior panels. Trim/interior panels shall have as a minimum the physical properties of gage number 24 (.024" thickness) vinyl-coated aluminum. Trim/interior panel threaded fasteners or rivets shall secure trim/panels to body framing structure. Where fasteners are in the panels only, a reinforcing nut or reinforcing panel shall be installed for added strength and fastener retention.

e. Exterior lower skirt panels may be metal or fiberglass and shall be sufficiently stiff to prevent vibration, drumming, or flexing while the bus is in service. Body front and/or rear endcaps may be molded fiberglass panels installed with required structural framing or a FRP composite structure. Highly corrosion resistant metal lower-skirt panels shall consist of compatible materials not subject to electrolysis and shall be sufficiently fastened and braced to prevent damage from ice and snow build-up. Metal lower skirt panels shall be properly coated to resist corrosion (exterior and interior), see Section II., Part M., Undercoating. Lower skirt panels may be one piece in length at manufacture but shall be repairable in sections. Lower skirt panels shall not use a wood substrate material for a panel stiffener. Where exterior panels are lapped, the upper or forward panels shall act as a watershed. Exterior panels that are cut shall have the cut edge sealed (paint or special sealing compound). Sealing and fastening of panel joints, including front and rear cap-to-body joints, shall prevent entrance of moisture and dirt. Joint sealing shall be made through use of a non-shrinking bonding sealant, and joint sealing shall not be solely dependent on an exterior trim strip or a trim cap nor shall the sealing of the panels be dependent on caulking alone. All exterior panels shall be buck riveted and/or bonded to the body frame structure. Exterior metal panels shall be given a thorough anti-corrosion treatment.

f. The exterior body panels shall have on each side one heavy-duty rubrail. Rubrails (1½" x ½" minimum) shall be extruded solid aluminum or extruded UV resistant plastic with a flexible, rubber-type resilient material insert or a solid rubber-type of flexible, resilient material. Rubrails shall be located no less than 25" nor more than 43" above the ground on each side. Rubber fender splash guards shall be installed on front and rear wheel openings. Where the rubrails and fender opening guards are not an integral part of the body, installation of rubrails and fender opening splash guards shall be made after the finish coat of paint is applied to the bus.

g. Gun installed huckbolt fastenings, buck rivets, bonding adhesives, or approved equivalent shall be utilized on all exterior body panels, rubrails, and all other locations where stress is concentrated. All rivets, screws, bolts, nuts, washers, clamps, and other types of fasteners used in the construction process, including those that would be exposed to the elements, on the exterior and interior of the unit shall be properly plated to resist corrosion. No sheet metal screws shall be permitted, except for rubrails and rubber fender splash guards which can be secured with stainless steel or equivalent plated locking-type, self-tapping fasteners. Fastener materials shall be compatible with materials being fastened. Where self-tapping fasteners are used, body panels shall be reinforced with steel backing, aluminum backing, or stainless steel backing.

h. Window openings cut into body panels shall have a maximum frame clearance of ⅛" on each side to minimize the need for caulking (see Section II. V., Windows). All openings cut into metal body exterior panels must have the exposed cut edges primed

or properly coated to inhibit water intrusion and corrosion before further assembly or painting occurs. Window frames installed in the body openings, shall be properly caulked/sealed to prevent intrusion of moisture and dust.

2. Fiberglass Reinforced Plastic (FRP) Composite Unitized-type Body

a. The bus body shall have a heavy-duty unitized structure and shall be of durable fiberglass reinforced plastic (FRP) composite construction. The body panels shall consist of an exterior high gloss gelcoat (.020" thickness, minimum) on a resin-hardened FRP (3/16"thickness, minimum) attached to a center layer of resin hardened Verticel® or equal honeycomb (¾" thickness, minimum) with an inner FRP panel (3/16" thickness, minimum); or may be ¾"polyurethane foam insulation gelcoated to ¼" FRP exterior with ¼" FRP interior, reinforced with steel perimeter and transverse supports, completely fiberglassed to adjoining body parts. It shall use proper adhesive materials to adequately bond and mechanically fasten all joints and points of stress with sufficient strength to comply with the FMVSS 220 rollover protection test. Each bidder shall provide certification with the bid that the bus as bid meets the FMVSS 220 rollover protection test (see Section VIII).

b. The bus shall be designed to withstand road shocks, stop and start operations, seasonal weather and road extremes, and other conditions found in Michigan transit bus service. The body shall be securely fastened to the chassis frame structure using a method of uniform attachment consisting of strategically placed rubber isolators/cushions with connector bolts that permit body flexing independent of chassis flexing. Roof, side, front, and back panels shall be secured to the floor and lower body frame members; all of which shall result in a permanent, fully-integrated structural unit adequately reinforced at all points where stress concentration may occur. The body floor sub-frame assembly, including lower skirt reinforcements, shall be gage number 14 (.075" thickness) minimum galvanized steel (mill applied), stainless steel, aluminum, or cold or hot rolled steel with corrosion resistant coating (including steel treated with a sprayed on coating), each of which shall have equal mechanical and corrosion resistance properties as gage number 14 (.075" thickness) galvanized steel as a minimum. Wheelwells shall have minimum yield strength of gage number 14 galvanized steel, gage number 16 (.060" thickness) stainless steel, or gage number 12 (.10" thickness) aluminum properly welded or secured with approved corrosion resistant fasteners to the floor structure. Passage holes provided for wiring and hoses shall be thoroughly sealed and protected to prevent dust and moisture intrusion and be sufficiently protected to ensure against wear from friction and the elements. The entire lower body frame shall be coated with corrosion resistant primer/paint (steel) or properly treated to resist corrosion (other materials). All treated components shall be properly cleaned to remove greases, oils, and residues before application of the corrosion resistant material.

c. All exterior side and roof panels when completed shall be at a minimum 1⅛" thick. Bond lines at the side walls, rear endcap, roof, and front cap shall be interlocked by adhesives, resin saturated fiberglass matting, and mechanical fasteners, forming a unibody design without exposed fasteners or protruding moldings. Imbedded reinforcements equal to the structural members of the body shall be installed at all door openings in order to support door mounting hardware and door operating mechanisms. All door openings shall have full structural framing to maintain integrity of the body structure. All exposed door frame structure shall be made of 304 stainless

steel acid-etched, coated with zinc based primer and powder coated OEM white (including the fasteners).

d. Interior panels may be an integral part of the FRP composite panel or may be made of scuff-resistant vinyl-coated aluminum, textured paint on steel, or laminate/FRP finished material. Molded ABS may be used as trim but not for interior panels. Where threaded fasteners are in the trim/interior panel only, an imbedded reinforcing nut or a reinforcing panel shall be integrated into the FRP composite for added strength and fastener retention.

e. Exterior panels may be an integral part of the FRP composite panel. Exterior panels shall be sufficiently stiff to prevent vibration, drumming, or flexing while the bus is in service. Lower skirt panels shall be sufficiently fastened and braced to prevent damage from ice and snow build-up. Lower skirt panels may be one piece in length at manufacture but shall be repairable in sections. Where panels are lapped, the upper and/or forward panels shall overlap the lower and/or rearward panels to prevent intrusion of water under the panels. Sealing and fastening of joints, including front and rear cap-to-body joints, shall prevent entrance of moisture and dirt. All exterior panels shall be bonded to the lower body frame. In no case shall the sealing of the panels be dependent on caulking alone.

f. The exterior body panels shall have on each side one heavy-duty rubrail. Rubrails (1½" x ½" minimum) shall be extruded solid aluminum or extruded UV resistant plastic with a flexible, rubber-type resilient material insert or a solid rubber-type of flexible, resilient material. Rubrails shall be located no less than 25" nor more than 43" above the ground on each side. Rubber fender splash guards shall be installed on front and rear wheel openings. Where the rubrails and fender opening guards are not an integral part of the body, installation of rubrails and fender opening splash guards shall be made after the finish coat of paint is applied to the bus.

g. No sheet metal screws shall be permitted, except for rubrails and rubber fender splash guards which can be secured with stainless steel or equivalent plated locking-type, self-tapping fasteners. Fastener materials shall be compatible with materials being fastened and meet the 1000 hour ASTM D117 Salt Spray test and the 1000 hour ASTM D2247 Humidity Resistance test. Where self-tapping fasteners are used in body panels, the body panels shall have an imbedded reinforcing nut or a reinforcing panel shall be integrated into the FRP composite for added strength and fastener retention.

h. Window openings cut into body panels shall have a maximum frame clearance of ⅛" on each side, to minimize the need for caulking (see Section II. V., Windows). All openings cut into body exterior panels must have the exposed edges of the cutout properly coated to prevent moisture intrusion before further assembly or painting occurs. Window frames installed in the body openings shall be properly caulked/sealed to prevent intrusion of moisture and dust.

C. Passenger Door

1. The manufacturer shall provide a heavy duty electrically operated passenger entrance door. The passenger entrance door shall be a split-type double leaf swing door. This door shall have a flexible soft rubber cushion on the meeting edge 1½" in width, minimum. The door glass

shall be see-through, AS-2 tint (70% luminous transmittance) safety glass. Under all operating conditions and bus speeds, an airtight, watertight, and dust-proof seal shall be formed between the door and the stepwell, between the door and body opening, and between the door leaf sections. The door leading edge opening speed shall not exceed 18 inches per second and the closing speed shall not exceed 12 inches per second to provide a total door closing or opening in 2 to 4 seconds. The front passenger entrance door shall not extend below the step frame. The door shall be located on the right side of the bus near the front wheel. Any door with an exposed (metal showing) outer frame shall be made of 304 stainless steel acid-etched, coated with zinc based primer and powder coated OEM white (including the fasteners). The entrance door shall provide a 30" clear width opening, minimum. Door opening height from the top of the first step to the door header shall be a minimum of 76". Where interior height is low at the entrance header, the header shall be padded to prevent injury to those exiting the bus.

2. The door frame strength and electric door operator strength shall be designed to match the entrance door size. The operator for the entrance door shall be located in an overhead compartment above the passenger entrance doorway; shall be concealed from passengers; and shall be easily accessible for servicing through a hinged access door. The access door shall be hinged to open up with a holding device and shall be as large as will fit in the overhead compartment space. Door motor operation shall be limited electrically to control door travel at full open and full closed positions and shall be adjustable to keep the door closed during bus operation. Physical door stops shall be used to prevent marring or damage to doors and/or surrounding parts. An entrance door manual release that allows disconnection and simple re-engagement of the door operator shall be provided so that the entrance doors can be manually opened in the event of loss of electrical power or other emergency. The door operator motor shall not run continuously when the manual release is operated. Electric door operator, door linkage, and baseplate components shall be of a single manufacturer. Suggested source: Excell, Vapor, or equal.

3. The passenger door control switch shall be located in the driver's compartment within easy reach of the driver and be clearly marked for "open" and "close" (switch shall operate the same on all buses). The control switch shall be powered by a constant battery feed circuit with circuit breaker protection. The control switch shall be "hold on" for operation and of a different color than other standard switches.

4. A method shall be provided to lock all entrances to the bus when it is not in use.

D. Passenger Stepwell

All entrance steps and stepwells shall be gage number 14 (.075" thickness) stainless steel, minimum. Steps and stepwells shall have adequate structural bracing. All metal trim hardware in the stepwell area shall be stainless steel. All fasteners in the stepwell area shall be stainless steel which will pass the 1000 hour ASTM D117 Salt Spray test and the 1000 hour ASTM D2247 Humidity Resistance test. Ground to first step shall not exceed 12" in height, each additional vertical step shall not exceed 9½" and all tread depths shall be 9" minimum. All steps in the entrance stepwell shall be of the same width. A suspension kneeling feature may be used to achieve the required 12" step height. Stepwells shall be covered with flooring material as described in Flooring, Section II., F., Item 3). Any interior stainless steel except for exposed door frames shall be brushed, not painted.

E. Interior

1. The interior of the bus shall provide a pleasant, aesthetically pleasing atmosphere. The door and driver instrument panel are to be painted or otherwise finished with a nonreflective, anti-glare finish which matches the overall interior tones of interior panels. All interior hinged access doors shall use SouthCo Model #M-61-1 or equal latch to hold the door positively closed. All interior markings shall be durable materials affixed to the interior panels' smooth surfaces or markings shall be durable materials affixed to metal plates fastened to the interior panels of the bus. The interior design and colors shall be approved by the State.

2. All interior panels may be made of scuff-resistant, vinyl-coated aluminum, textured paint on steel, or laminate/FRP finished material. A light grey color shall be installed in the interior area above the seat rail lines, in the ceiling area, and on the rear endwall. All materials and treatments shall be easily cleaned. Panel fastening devices shall match color of panels. All interior finished surfaces shall be impervious to diesel fuel, gasoline, and commercial cleaning agents. Finished surfaces shall not be damaged by controlled applications of graffiti-removing chemicals.

3. The interior height of the passenger compartment at center aisle shall be 74" minimum. At 6" from the sidewall there shall be 67" of interior height, minimum, with a gradual contour to the center aisle (no bulkheads). Interior headroom at the back of bus (rear air conditioning evaporator area) may be reduced to a minimum of 60 inches, but it shall increase to the normal ceiling height at the front of the rear seat cushion. The interior width at seat line shall be 90", minimum.

4. All surfaces, items, or hardware in the passenger compartment having sharp edges, corners, or angles that could cause injury, shall be padded with a heavy-duty, vinyl-covered, energy absorbing material to match interior colors. Areas inside the passenger compartment of low headroom where a person is prone to strike his head shall be marked and padded. All handrails shall have rounded edges where exposed.

5. A storage area with a hinged, lockable, access door shall be provided in the interior area either above the windshield (without destination sign) or on the side above the driver as space permits. This area above the windshield shall also be constructed to adequately support 60 pounds of two way radio communication equipment. A restraint shall be installed to prevent any storage door from opening beyond 105° when the installation allows the door to swing down to open.

F. Flooring

1. The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement. All floor fasteners shall be corrosion resistant steel and shall remain secured and corrosion resistant for the service life of the bus. The floor deck shall be ¾" A/B plywood of marine grade material, minimum, with sealed edges to prevent moisture intrusion. The floor deck upper surface shall have all cracks and voids filled and the whole surface rough sanded before installing the flooring material. A layer of sealer shall be installed between floor deck edges that butt against structural members and other deck sections to prevent dust and moisture intrusion. Passage holes provided for wiring and hoses in the floor deck shall be thoroughly sealed to prevent dust and moisture intrusion and be sufficiently protected to ensure against wear from friction and the elements. Passenger seating floor rail/track shall not be installed in the wheelchair lift or wheelchair securement areas.

The floor deck, including the sealer, attachments, and coverings, shall be waterproof, non-hygroscopic, resistant to wet and dry rot, resistant to mold growth, and impervious to insects. The floor deck shall not be sandwiched between the wall structural members and the floor structural members.

2. The stepwell, entrance area, and center aisle floor area shall be overlaid with ribbed, slip resistant, oil resistant commercial RCA Rubber Transit-Flor® or equal, 1/8" floor and 3/16" step tread thickness.

3. The aisle to door area flooring joint shall make a miter so that aisle and door area flooring grooves line up for easy cleaning.

4. The 1/8" thickness flooring under the seats and in the wheelchair area shall be smooth, slip resistant, oil resistant RCA Rubber Transit-Flor® or approved equal. The flooring shall extend up the sidewall to the seat rail line and shall be coved at the floor/wall joint to form a smooth water-tight transition. Flooring adhesive shall be oil resistant.

5. Step treads shall be two-piece ribbed rubber flooring. Each tread shall have a band of bright yellow contrasting color molded in the full width of the step (must meet ADA contrast requirement). Step tread to stepwell joints shall be sealed to prevent intrusion of moisture and debris.

6. An aisle width standee line of bright yellow contrasting color shall be placed crosswise in the aisle just behind stepwell (must meet ADA contrast requirement).

7. Color of all flooring and step treads shall be RCA Rubber Transit-Flor® or equal grey (#766) or tan (#777) as requested by the agencies.

8. To provide easy access for service, the floor shall have a vapor and fumeproof bright aluminum diamond plate access panel to reservoir fill/check areas and fuel tank sending unit.

9. Wheelwells shall be thoroughly sealed to prevent intrusion of moisture and dirt. Metal wheelwells inside the passenger compartment shall be covered with flooring material or molded fiberglass (FRP or ABS).

10. Standee decals shall be furnished and mounted at the center of the bus above the windshield.

G. Emergency Exits

1. Each bus shall be equipped with a rear exit door with a minimum opening of 1296 square inches with a minimum size of 24" by 54" (a rear exit window in place of the door is optional). All exposed exit door frame structure shall be made of 304 stainless steel acid-etched, coated with zinc based primer and powder coated OEM white (including the fasteners. The rear door exit and side window exits shall meet federal requirements of FMVSS 217. The manufacturer shall provide a method to lock the rear exit door. The rear exit door shall have an audible alarm at the driver's area activated when the exit door latch handle starts to open and when the exit door is locked with the ignition on. A bus with a rear exit door shall have one small window on each side of the exit door in the rear endcap.

2. The rear exit door shall have two windows, an upper window and a lower window, as a part of the door. The door glass shall be see-through, AS-2 tint (70% luminous transmittance) safety

glass. The upper door window height shall match top of rear bus windows, one on each side of rear door. Door windows shall match design of bus rear windows. Any door with an exposed (metal showing) outer frame shall be made of 304 stainless steel acid-etched, coated with zinc based primer and powder coated OEM white (including the fasteners). Heavy-duty door latch mechanism with handle guard shall provide a quick release for opening from inside and outside the bus but be designed to offer protection against accidental release. The door latch shall cause the door to compress the perimeter door seal to provide an airtight, dustproof and watertight seal around the door under all operating conditions and speeds. The door must also have a sliding door stop mounted on top of the door to automatically lock door in the open position for emergency use. This door stop must also have a manual release. Door panels shall match exterior and interior body panels (see section II. A., B., and C.). All doors shall be fitted with screwed or bolted-on heavy-duty stainless steel piano hinges or heavy duty hinges of a noncorrosive material. A restraint shall be installed to prevent the door from opening beyond 105° or striking the rear panel of the bus when the door is opened.

3. A passage way of 16" minimum width shall be provided to the rear exit door. No seats or other objects shall be placed in bus which restricts passageway to rear exit door.

4. One non-closing static exhaust vent, a combination roof vent-emergency exit (23" by 23" minimum), shall be installed at the mid point on the longitudinal center line of the roof of the passenger section of the bus. The roof vent-escape hatch shall provide fresh air flow inside the bus when opened and when the bus is in a forward motion. The escape hatch shall have an inside and an outside release handle. There is no warning buzzer requirement for the escape hatch. Suggested source: Specialty Manufacturing Co., Transpec Inc., DMA 1122 or equal.

5. Instructions for proper use of all emergency exits shall be marked in close proximity to the release mechanisms. All interior markings shall be durable materials affixed to the interior panels' smooth surfaces or markings shall be durable materials affixed to metal plates fastened to the interior panels of the bus. Instructions may be labels affixed to the window. All emergency exits shall be marked on the exterior of the bus.

6. Lever-type latches used for emergency windows shall secure the windows tightly shut, shall be easily operated, and shall not unlatch due to vibration during bus operation. The latches shall be made of non-corrosive materials and be designed for minimal maintenance needs.

H. Gauges

Chassis Original Equipment Manufacturer (OEM) gauges shall be used in the driver's instrument cluster, but if they are not available VDO brand gauges, Stewart Warner gauges, or equal shall be used. Each vehicle shall have an instrument cluster with the following non-glare needle-type gauges which are easily monitored by sight from the driver's position (lights in lieu of gauges are not acceptable).

1. Voltmeter and its wiring shall be compatible with generating capacities.

2. Engine oil pressure gauge.

3. Engine coolant temperature gauge.

4. Fuel gauge.

I. Farebox

1. The farebox (a donation box is optional) shall be mounted with the trip handle toward the driver and within easy reach of the driver. The farebox shall be mounted on an adequately braced stanchion; shall be located over a flat floor surface near the driver; and shall be accessible to passengers entering bus (meet ADA requirements). An indirect farebox light shall be connected through an entrance door jamb switch to the running light circuit.

2. The farebox shall be lockable and supplied with two vaults that are interchangeable and lockable (2 keys for each lock). The vaults shall be keyed alike. The vault and farebox exteriors shall be marked with key reference. (Location shall be approved by the State at pilot model inspection.) Suggested source: Main Farebox Model M-4 or equal.

J. Bumpers

The front bumper shall be a painted black or gray OEM bumper. The rear bumper shall be a high energy absorbing bumper. The rear bumper shall be installed per bumper manufacturer's specification. Bumper attachment shall use a minimum of SAE grade 8 fasteners with thread locking feature or other shake-proof (Nord-Lock or equal) mounting in all attachment brackets. Rear anti-ride bumper installation shall allow space between bumper and body for energy absorption movement without body damage. Lifting pads shall be provided as part of the vehicle so that the vehicle may be lifted (at curb weight) at the front and/or the rear without any deformation or damage to the vehicle or bumpers and mounting hardware. Rear Bumper Suggested source: Romeo R.I.M. Inc. H.E.L.P. bumper or equal.

K. Mud Flaps

The bus shall have commercial grade anti-sail mud flaps/splash aprons behind front and rear wheels which contain no visible imprinted logo or advertising. An inverted stainless steel "T" bracket shall be used to prevent the wind movement of the mud flap when the bus is in motion. The flaps/aprons shall be securely fastened with full width metal strips and appropriate fasteners. The flaps/aprons shall be compressed between a gage number 11 (.125" thickness, minimum) support bracket and a gage number 14 (.075" thickness, minimum) metal strip. The support bracket shall be fastened securely to the body substructure or chassis frame. The flaps shall extend to within 6" of the road surface at curb weight. The mud flaps/aprons shall be at least 1" wider than the tire widths (single front, dual rear) to control splash at the rear of wheel openings. Rubber fender splash guards, secured with stainless fasteners shall be installed on all wheelwell openings. Other mud flaps/splash aprons/shields shall be installed to protect bus equipment (AC components, batteries, front wheel inner shield, auxiliary heater box, and the like) from road splash.

L. Towing

Tow hooks shall be provided with two in the rear of the bus, which shall be of sufficient strength to tow 1½ times the GVWR of the bus. Tow hooks shall be easily accessed and free of interference with the bumper system when in use. Access to tow hooks may be made through holes in the bumper assembly. The intended use for tow hooks is only to safely move the bus to a point of tow truck hook-up. Tow hooks shall be installed to prevent them from dragging when the bus is driven over an incline. The tow hooks equal to Original Equipment Manufacturer (OEM) units shall be mounted and adequately secured to the chassis frame as recommended by the tow hook manufacturer or may be supplied by the OEM as standard equipment on the chassis. The vehicle shall be designed to be towed from the rear. A fuel tank protection frame shall not interfere with a frame contact lift. The

bidder shall provide the towing and lifting procedure to be followed.

M. Undercoating/Rustproofing

1. Undercoating shall be applied to the underside and edges of plywood flooring before installation. When the unit is completed, the sections of the underside of the bus exposed to the elements shall be treated with an undercoating material except those areas of the OEM chassis where undercoating is not recommended. Undercoating shall be warranted for the same period covered by the body/structure warranty. Suggested source: Tectyl 121-B or equal.

2. Rustproofing - All box type steel tubing (except stainless steel) used in the floor shall have the interior of the tube coated with corrosion resistant material conforming to MIL-C-62218 as outlined in Federal Standard 297E. Sections that are treated shall be properly cleaned to remove greases, oils, and residues before application of the corrosion-proofing material. All mechanisms (moving or stationary parts) that are affected by or rendered useless by an application of sealant or insulation shall be cleaned free of sealant or insulation including vent canisters and drain pipes. Rustproofing shall be warranted for the same period covered by the body/structure warranty. Suggested source: Waxoyl, Ziebart Type-A or equal.

N. Interior Mirrors/Sunvisors

1. Interior Mirror

Interior mirror (with adjustable mounting bracket) shall be a 4" by 10" flat mirror glass with rounded corners, minimum. The driver shall be able to adjust the mirror so that the complete passenger compartment can be viewed through interior mirror. Location shall be determined at pilot model inspection. Suggested source: ROSCO (with bracket), B&R Manufacturing, Manufacturer's standard, or equal.

2. Sunvisor

Windshield sun visor system shall be standard Original Equipment Manufacturer (OEM) chassis visor(s). If the OEM chassis is not equipped with a windshield sun visor, large transit-type, fully adjustable arm-type plexiglass sun visor(s) shall be provided for the driver at the windshield. Location shall be determined at pilot model inspection. Suggested source: manufacturer's standard.

O. Exterior Mirrors

1. Each bus shall be equipped with exterior left-hand and right-hand rear view mirrors of flat glass with convex mirrors (3" in diameter, minimum) attached or a combination flat/convex glass. The mirror shall contain at least 50 square inches of flat glass viewing area. Right hand mirror assembly shall be a fender ridge mount. Left hand mirror shall be a sail mount style. Suggested source: Mirror Lite Co, Inc., ROSCO, B&R Manufacturing, Lucerix/Metagal, or equal.

2. To prevent obstructed front and right-hand view a convex 15 degree radius (curvature) exterior crossview mirror (8" minimum diameter) shall be provided on the left-hand front corner of the bus. Suggested source: Manufacturer's standard.

3. All exterior mirrors shall be constructed with high impact plastic or stainless steel housings.

Mirrors shall be remote adjusting and shall move independently of the mirror housing. The mirrors shall be modular in design so that the glass can be replaced using the "twist lock" mechanism for service without removing the entire mirror assembly from the bus.

4. Mirror mountings shall be reinforced when not in a structural frame member to prevent mirror vibration, with approval by the State at the time of pilot model inspection. The mirror placement shall not obstruct driver vision nor have window divider bars between the driver and mirror face. Final location of exterior mirrors shall be determined at pilot model inspection.

P. Seats

1. Driver's Seat

a. The driver's seat shall comfortably hold and support the human body in the correct position for driving and meet the flammability requirements of FVMSS 302. The driver's seat with arm rests (right side seat arm rest, left side door arm rest) shall have adjustments for fore and aft slide, 4" minimum travel, back recline, 20 degrees minimum, and weight range capacity up to 300 pounds. While seated, the driver shall be able to make all of these adjustments by hand without complexity, excessive effort, or being pinched. Manual operated adjustment mechanisms shall hold the adjustments and shall not be subject to inadvertent changes. The seat shall be high-backed and shall be properly aligned behind steering wheel to allow for maximum seat adjustments and operator comfort. The seat belt with shoulder harness, automatic retractor and supplemental restraint (SRS) system shall be chassis Original Equipment Manufacturer (OEM) equipment. All seats and seat mountings shall meet applicable federal standards. Suggested source: Freedman or equal.

b. The driver's seat cushion shall be molded high resilient (HR) polyurethane foam padding with indentation load deflection (ILD) 35 pounds minimum, and the back cushion shall be molded or fabricated high resilient (HR) polyurethane foam padding (ILD) 25 pounds minimum. There shall be no welt or bead across the front of the seat cushion under the driver's legs. Compression to 10 percent maximum and tensile strength 15 lbs. per square inch minimum. Seat and back cushion foam shall meet the typical physical properties of ASTM D-3574 and the flammability requirements of FMVSS 302.

c. The driver's seat covering shall be gray cloth-type Woven Fabric (with flame retardant qualities) meeting the requirements listed below in All Seats, Part 4.

2. Passenger Seats

a. All passenger seats shall be mid-back and are required to meet the following:

(1) Complete White Book tests
(2) All applicable FMVSS testing including FMVSS 210
(3) Comply with cloth-type woven and vinyl fabric seat covering material test and performance criteria of the Federal Register dated October 20, 1993 (see Section IX., table 1).

b. Two passenger, forward facing seats shall be 35" minimum width with a non foam

energy absorbent vandal-proof grab handle mounted to the top of each seat back (two per double seat). Grab handles are not required on seats that are against a wall.

c. Single passenger seats shall be 17½" minimum width with an energy absorbent vandal-proof grab handle mounted to the top of the seat back.

d. Forward facing seats shall have 27" minimum knee to hip room.

e. Aisle facing seats shall have arm rests on both ends if the seat is not against a modesty panel.

f. Aisles shall not be less than 16" wide except as noted in Part 3 of this section.

g. Suggested sources: American Seating Horizon™ 8535 Mid-Back Series; C.E. White LE Series; Freedman Feather Weight; or equal.

3. Wheelchair Lift-Equipped Buses

Forward facing (double) fold-away or flip seats with seat belts shall be provided in the wheelchair securement area per seating arrangements (see Section III, Wheelchair Securement Area). All side facing seats provided shall be flip seats. Fold-away or flip seats shall include all dimensional, structural and testing requirements of the standard seat specification. Seat locking/latching devices shall be of high quality and be easy to latch and unlatch. Seats must positively latch in the seated and folded position to prevent inadvertent folding or unfolding of the seat. Any support legs resting on flooring shall be non-marring or rest on metal plates flush mounted with flooring. All fold-away seats shall be able to pass FMVSS 210 without having to fasten additional latches or cables. All fold-away seats shall fold against the wall when wheelchair space is required (no further than 12" from wall in the vertical folded position). Seat may not extend into bus more than 37½" (two passenger) and 18½" (1 passenger) when folded down for passenger seating. Aisle space may be reduced to 14" inches where fold-up seating is placed on each side of the aisle or 15½" where placed opposite a stationary seat. The seat bottom cushion shall be a 5 degree tilt up from level, minimum, and back cushion shall be at 95 degrees, minimum. The seats shall be of the same design as the other passenger seats. All seat backs and all seat bottoms of fold-away/fold-up seats shall be covered with material matching seat cushion color and fabric. Suggested source: American Seating Horizon™ 8535 Mid-Back Series; C.E. White LE Series; Freedman Feather Weight; Braun #125; or equal.

4. All Seats

Seats shall be individually contoured to each passenger for occupant comfort and retention. Seats shall be covered with cloth-type woven fabric or vinyl fabric at the transit agency's option. Cloth-type fabric or vinyl shall completely enclose the seat cushion and the seat back. Cloth-type fabric or vinyl shall comply with test and performance criteria of the Federal Register dated October 20, 1993 (see Section IX., table 1). Seat colors shall be a tan background or grey background approved by the State.

a. Cloth-type Woven Fabric Requirements (with flame resistant qualities)

(1) Minimum weight 23 ounces per linear yard.

(2) 50,000 minimum double rubs (ASTM - 3597-77 Wyzewbeek Method).

(3) Color fastness to light 300 hours minimum (AATCC-16-1977 Carbon Arc.)

(4) Comply with cloth-type woven fabric seat material test and performance criteria of the Federal Register dated October 20, 1993 (see Section IX., table 1).

(5) Comply with California BLT-117.

(6) All cloth-type woven fabrics except Holdsworth Wool shall be treated with a flame proofing solution following the manufacturer's specifications, No-Flame by Amalgamated Chemical Inc., or equal.

(7) Suggested source: Flame Resistant Fabrics by Kings Plush; Holdsworth Wool; or equal.

b. Vinyl Fabric

(1) Seat vinyl fabric shall be transportation grade expanded vinyl, 36 ounces per linear yard minimum.

(2) Seat vinyl fabric shall comply with test and performance criteria of the Federal Register dated October 20, 1993 (see Section IX., table 1).

(3) Suggested source: Flame Resistant vinyl by Omnova or equal.

c. Seats General

(1) Seat cushion and back cushion shall be molded high resilient (HR) polyurethane foam padding. Seat cushion indentation load deflection (ILD) shall be 35 pounds minimum, with compression to 15 percent maximum, and tensile-strength of 15 minimum. Seat and back cushion shall meet the physical properties of ASTM D-3574 and the flammability requirements of FMVSS 302, minimum. The technical data sheet for the foam supplied shall be included in the bid proposal with the seat information. Suggested source: Manufacturer's standard.

(2) The seating arrangements and configuration shall be furnished by the State. The first double seat on the passenger side of the bus shall have an integrated child restraint seat capable of safely carrying children of 20 to 50 pounds.

(3) All seats shall be supported on the floor with high carbon steel support brackets. Seat frame shall be cold-roll steel tubing. Floor anchorage shall be neat and not interfere with entering and exiting the seat. All seat mounting bolts shall be a corrosion resistant coated/plated fasteners. Passenger seating floor rail/track shall not be installed in the wheelchair lift or wheelchair securement areas. The bidders shall provide certification test data that the installation of the seats, seat mountings including floor anchorage and floor fasteners shall meet all applicable FMVSS including FMVSS 207, 208, 209, and 210 for the bus model being offered in this bid. (see Section VIII. N.).

(4) Seat and back cushions shall be supported with a spring-type support system. Seat and back cushions shall be completely covered with seat cushion covering material. Seat back depth shall not exceed 3½" overall.

(5) All metal components of the seat assembly shall be coated with a powder coat epoxy paint finish that shall meet the following tests:

Salt Spray	1000 hrs	ASTM D117
Humidity Resistance	1000 hrs	ASTM D2247
Impact Resistance	to 80 in-lbs	ASTM D2794

All testing is to be performed on standard metal seating materials that have coating thickness of 1.3 to 1.8 mils. Certified test documents are required with bid proposal.

5. Passenger Seat Belts

The bidders shall provide certification test data that the seat belts, and the installation are in compliance with FMVSS-207, 208, 209, and 210 where applicable for the bus model being offered in this bid (see Section VIII. N.).

Two universal "Buckle Up" decals approximately 6" by 6" shall be furnished loose with each bus. Decals shall indicate that seat belt use is recommended.

All seats shall be equipped with seat belts for each designated seating position. Belts shall have:

a. The latch end of the belt will have an emergency locking retractor. The retractor will be mounted underneath the seat to the seat frame. No lap retractors.

b. A push button latch release mechanism.

Q. <u>Handrails, Stanchions</u> (Shall meet ADA regulations)

1. The handrails and stanchions shall be a minimum of 1¼" outside diameter. All handrails and stanchions shall be positioned so as not to interfere with wheelchair movement and shall meet ADA requirements for position and size. All handrails and stanchions in the passenger entrance area shall be highly visible yellow in color. All other handrails and stanchions shall be brushed stainless steel. Mounting brackets and fittings shall be composed of the same kind of material used for the stanchion or handrail.

2. All handrail and stanchion mountings shall have reinforcement plates welded to or imbedded in the structure behind surface panels of sufficient strength to withstand passenger force. Final locations shall be determined at pilot model inspection.

3. A floor-to-ceiling vertical stanchion shall be provided in close proximity to the rear of the driver's area. A guardrail shall be provided in back of the driver's area extending from the vertical stanchion to the left side of the bus 30" plus or minus 2" above the floor. A padded modesty panel shall be provided from the guardrail to within 8" of the floor. Stanchion and guardrail shall not restrict any driver's seat adjustments.

4. A smoked plexiglass panel, 3/8" thick, shall be provided behind driver from top of the driver's seat to within 12" of bus ceiling. The panel shall not impair driver's seat adjustments. The panel shall be located to allow the driver's seat back to recline to ½ its maximum reclined adjustment with the driver's seat in the position furthest from the steering wheel. Panel may be incorporated into the stanchion and guardrail behind the driver and shall have cutouts to give hand access to the vertical stanchion.

5. Floor-to-ceiling stanchions (yellow) shall be provided near aisle on each side of front entrance.

6. Left and right side entrance handrails (yellow) shall be installed from low stepwell to floor-to-ceiling stanchions near aisle. Entrance handrails shall be positioned so passengers entering or exiting the bus will have handrail support throughout the entering/exiting process and so that articles of clothing may not become entangled in the handrail-stanchion-guardrail assemblies.

7. A guardrail (yellow) shall be provided in front of and at the rear of the front entrance steps, extending from the vertical stanchions to the right side of the bus 30" plus or minus 2" above the floor. A modesty panel (padded and vinyl clad both sides) shall be provided to the left (rear side) of the entrance from guardrail to floor (in case of lift bus, provide floor-to-ceiling stanchion to rear of platform lift with guardrail and modesty panel padded both sides, vinyl clad, with smoked plexiglass panel, 3/8" thick over the modesty panel which will prevent someone from touching the lift when it is in operation).

R. Interior Lighting

1. Overhead entrance and stepwell lights shall provide no less than two foot-candles of illumination on the entrance step tread, or lift or ramp with the door open. Outside light(s) shall provide at least 1 foot-candle of illumination on the street surface within 3 feet of step tread outer edge. This system shall provide illumination automatically when the door is open and meet ADA requirements.

2. Overhead entrance and stepwell lights shall be wired to and be automatically activated by a door controlled switch. Lights shall operate any time the ignition key is on and the door is opened.

3. Stepwell light shall be on the side away from wheel splash.

4. Interior lighting shall provide a minimum of two foot-candles of illumination at a reading level. Interior lighting fixtures shall be reasonably flush with the interior walls and ceiling so no hazard exists for the passengers. All lights shall have lead wire long enough to remove light at least 6" from bus for service. All interior lights shall be grounded by an in-harness ground attached in the fuse panel to a common grounding point.

5. Light installation shall be designed to illuminate the lift platform when deployed at floor level at no less than two foot-candles of illumination. Outside light(s) shall provide at least 1 foot-candle of illumination on the street surface within 3 feet of step tread outer edge. This system shall provide illumination automatically when the lift door is open and meet ADA requirements. On-off light switch shall be lift door-actuated.

S. Exterior Lighting

1. Exterior lighting shall be in accordance with Federal Motor Carrier Safety Regulations (393.11) and ADA regulations. All lights shall have the lead wires long enough to remove the light at least 6" from bus for service. All exterior lights shall be grounded by an in-harness ground attached in the fuse panel to a common grounding point. All exterior lights of the bus shall be light emitting diodes (LED) sealed lamps retained in a rubber grommet mounting except for front headlamp/turn signal assemblies. All lights shall have the mounting to body sealed to prevent moisture intrusion.

2. All lights in the rear panel of the bus shall be rubber grommet mounted round LED sealed lamps (Dialight, Grote, Peterson, Truck-Lite or equal) except back-up lamps and the license plate lamp. License plate lamp shall be Peterson Model M439 with plug B142-49 or equal for those not mounted in the preformed recess in the rear panel. A sealed light with a weather proof connector shall be used when the preformed recess in the rear panel is used. Back-up lights shall be standard rubber grommet mounted round sealed clear lamps.

3. Exterior marker lights shall be light emitting diodes (LED) (2" in diameter sealed lamp) retained in a rubber grommet mounting and conform to Federal Motor Carrier Safety Regulations Part 393 (Dialight, Grote, Peterson, Trucklite or equal). All marker lights shall have a weather proof two prong (one positive and one ground) plug-style connector with the ground wire connected to an in-harness ground attached to a common grounding point. Marker and tail lights shall be operated through a relay controlled by the headlight switch.

4. Red voltage regulated LED high mount stop lamps shall be mounted centrally in the rear panel of the bus and work in conjunction with the brake lights. On buses with a rear emergency exit door, a 6½"x2¼" minimum, (Command Electronics model 003-82, Dialight, Grote, Peterson, Truck-Lite or equal) oval light shall be mounted between the upper and lower windows on the exit door and a 4" round light shall be mounted on the rear of the bus body just above the rear door. On buses with a rear emergency exit window, the two 4" round lights shall be mounted on the rear of the bus body with one just below and one just above the rear emergency exit window. Final location of high mount stop lamps shall be determined at pilot model production.

5. Brake lights shall be red 4" round sealed voltage regulated LED lamps and shall not override hazard flashers or turn signals. Rear turn signal lamps shall be amber 4" round sealed voltage regulated LED lamps.

6. Headlights shall be Halogen lamps and the standard front park/turn lights may be a part of the OEM headlight assembly.

7. License plate mounting shall be with stainless steel screws and jack nut model 6SJN by Wm. F. Hurst Co. or equal for securing license plate.

T. Safety Equipment

All safety equipment provided by the manufacturer shall be secured to each vehicle and be easily accessible to the driver. Location of safety equipment shall be determined at pilot model production. The safety equipment shall be:

1. One UL listed 5 pound, 2A-10BC dry chemical fire extinguisher. Fire extinguisher shall have

a metal head, a gauge to indicate state of charge, and a bracket with strap for securement. Source: Manufacturer's Standard.

2. One container of bi-directional emergency reflective triangles that meets FMVSS 125.

3. One web cutter shall be provided from the supplier of the wheelchair securement belts for use in an emergency.

U. Heating/Ventilating/Air Conditioning (HVAC)

1. During normal passenger service, front and rear heavy-duty heating system shall be capable of raising the interior temperature of a bus from 0°F to 60°F at knee level (22" above the floor) throughout the interior of bus within 30 minutes from engine startup. After initial warm-up, while the bus is in passenger service, the front and rear heavy-duty heating system shall be sufficient to maintain a minimum of 64°F at knee level throughout interior of bus and at the driver's foot space when the outside temperature is 0°F. Heating system operation will be verified by the required system testing as defined in Section VII Part D. Heating/Ventilating (HV) Certification. In addition to the front heater and windshield defrosters, for increased air circulation, one 6" two speed fan with non-glare blades and body shall be mounted away from passenger and driver traffic in the driver's area near the windshield. Grounding for all heater fan motors shall be supplied by an in harness ground wire attached in the fuse panel to a common grounding point. All HVAC fan motors shall be supplied with proper radio frequency (RF) suppression equipment to remove two-way radio interference.

2. Front heating unit shall be automotive in-dash type (chassis Original Equipment Manufacturer (OEM) or equal) and shall be capable of delivering heat, fresh air ventilation, and air conditioning (optional) to the driver's area. The front heater shall have a temperature control valve which can be regulated from the driver's area. The driver's area shall have air circulation in each mode of defrost, heat, fresh air ventilation, and air conditioning (optional) of 125 cfm at the foot area, with a total driver's area circulation of 400 cfm minimum.

3. Rear heating unit(s) shall distribute heat in at least a 180° direction and ensure air distribution to all passenger areas of the bus interior. Heating unit(s) shall have a minimum 5/8" I.D. heater inlet and outlet ports with a BTU/hr output rating to match the specified HVAC performance requirements. Coolant flow through the heating units shall not be restricted by excessive bends or kinks in hoses or excessive lengths of hoses. Heating units shall have rubber or nylon insulator(s) between their mounting base and floor of the bus. Suggested sources: AMFAB Inc., A. R. Lintern, Bergstrom, Pro-Air, or equal.

4. The premium heater hose (5/8" ID minimum) shall be high temperature resistant Ethylene Propylene Diene Monomer (EPDM) material. Hose shall be a reinforced type with Aramid knitted fiber reinforcement between the EPDM tube and EPDM cover. Heater hose material shall be compatible with all types of coolant including long life coolant. Rated temperature limits of the hose shall be -40°F to +300°F minimum, with a burst pressure of 130 PSI minimum.

5. Manual shut off valves for the rear heater shall be placed as close to the engine as is practical. The 5/8" ID heavy-duty brass 1/4 turn ball shut off valves shall be located in the heater outlet line (from engine to heater) and in the heater inlet line (to engine from heater). Shut off valves shall be accessible by personnel without going under the bus (may require an access panel door). Location to be determined at pilot model inspection.

6. Front heater shall have coolant temperature control valve or other controls which can regulate heater temperature from the driver's area.

7. All heat lines and hoses shall: have interior routing where possible; be sufficiently protected to ensure against wear from friction and the elements; be insulated to reduce heat loss when exterior routing is used; use routing that eliminates excessive bends and hose lengths; and have heater hose passage holes through engine cowl and floor area thoroughly sealed to prevent air, dust, and moisture intrusion.

8. Air Conditioning (see Alternate Quotes, Section VI. A).

V. Windows

1. Passenger compartment windows shall be T-type slider at top, full slider, or top tip-in type for window ventilation. Windows shall have double-density safety glass and heavy-duty locking features which shall meet FMVSS 217 for emergency exits, if applicable. Window glazing material shall be able to maintain its seal and glass retention for the life of the unit. Caulking around windows shall be used only as a seal, not to make up for body defects or out of tolerance window openings (maximum clearance of ¼" around the frame, ⅛" on each side). All window glass shall be tinted – passenger windows AS-3 tint 31% luminous transmittance, right and left driver's side windows AS-2 tint 70% luminous transmittance, and windshield shaded-tinted AS-1 tint – and meet applicable federal standards. Driver's compartment right and left side windows shall be designed for maximum window area to provide unobstructed vision. Driver's compartment left side window shall be adjustable vent type (moveable front section of lower portion for ventilation) or chassis Original Equipment Manufacturer (OEM) door window. Driver's right side window shall be one piece. Suggested sources: Hehr, Kinro, or equal.

W. Paint

1. All exterior surfaces shall be smooth and free of visible fasteners (excluding round head structural rivets), dents, and wrinkles. As appropriate for the paint used and prior to application of paint, the exterior surfaces to be painted shall be properly cleaned and primed to assure a proper bond between the substrate and successive coats of original paint. Paint shall be applied smoothly and evenly, with the finished surface free of dirt, runs, orange peel, and other imperfections. All exterior finished surfaces shall be impervious to diesel fuel, gasoline, and commercial cleaning agents. Finished surfaces shall not be damaged by controlled applications of commonly used graffiti-removing chemicals.

2. All exterior paint shall be a two part acrylic-urethane-type or polyurethane-type with low volatile organic compound (VOC) emission. The finish coat of paint shall be applied before rubrail covers or inserts, fender flares, exterior lights, and other body mounted accessories are installed. Paint shall be applied in the following method:

   a. If on bare aluminum, use proper cleaner. Recommended sources: DuPont 2253, PPG, or equal, followed by aluminum conversion. Recommend sources: DuPont 2265, PPG, or equal.

   b. If on bare steel, use proper cleaner. Recommended sources: DuPont 5717S, PPG, or equal followed with steel conversion.

c. For all bare metal, use primer. Recommended sources: DuPont Prime 615/616 (two coats), PPG, or equal.

d. Appropriate primer as required shall be used on fiberglass surfaces.

e. Coat entire prepared surface to be painted with minimum of two coats of paint properly activated and reduced. Recommended sources: DuPont, PPG Concept System, Sikkens Corporation U-Tech brand, or equal.

3. Standard paint color for all buses shall be the manufacturer's pre-finished white exterior panels (OEM white), plus one 11" wide belt stripe in the color paint (no decals) requested by the ordering agency. Color scheme on all buses shall be provided at the time of ordering. Additional paint schemes will be quoted in VI. ALTERNATE QUOTES (OPTIONS) Item L. Special design paint application pricing will be negotiated at the time of ordering by the transit agency.

X. Insulation

1. Inside walls, ceiling, passenger floor area, driver floor area, and fire wall area shall be adequately insulated for sub-zero winters with spray-type foam insulation or glued in place insulation with a minimum R factor of 5. The insulation shall be non-formaldehyde, fire-resistant (FMVSS 302 minimum), non-hygroscopic, and resistant to fungus. Insulation shall prevent condensation and thoroughly seal bus so that drafts cannot be felt by the driver or passengers during operations with the passenger door closed. Insulation shall not cover up electrical wiring harnesses, electrical switches, or other devices and shall not be sprayed in wheelwells. All mechanisms (moving or stationary parts) that are affected, create a fire hazard, or are rendered useless by an application of sealant or insulation shall be cleaned free of sealant or insulation, including vent canisters and drain pipes.

2. Engine hood cover and driver's area shall have adequate insulation to keep driver's foot area cool during summer months, warm during winter months, and reduce engine noise to an acceptable level. The OEM insulation provided on the engine hood is acceptable.

Y. Type I Lift, Active (Platform Type) (Shall Meet ADA Requirements)

1. All vehicles equipped with lifts must meet FMVSS 403 and 404 requirements. All costs required to meet these requirements shall be included in the bid price.

2. The Type I platform lift (active lift) shall be installed in a separate door opening for use by persons with disabilities. The lift assembly shall be mounted within the bus body on the right (curb) side. The bus manufacturer must provide documentation (reviewed by the State at pilot model production) that the lift installation complies with the lift manufacturer's lift installation requirements. The overhead clearance between the top of the door opening and the raised lift platform, or highest point of a ramp shall be a minimum of 68" for a bus over 22 feet in length to meet ADA requirements.

3. The lift door(s) shall be manually operated with an outside key locking handle. Spring loaded struts, gas struts or manual latches shall be provided on the lift door(s) to positively hold the door(s) in the open position. All door openings shall have full structural framing around the opening equal to the structural members of the body. The lift door(s) shall have an upper window similar to the side windows of the bus. Any exposed lift door frame structure shall be

constructed of 304 stainless steel acid-etched, coated with zinc based primer and powder coated OEM white (including the fasteners).

4. The lift shall be an electro-hydraulic type. If the lift has a crossbar, it shall be above the door opening and well padded. The platform lift equipment shall be a double "C" channel parallel arm construction, hydraulically operated by two single-acting cylinders with gravity unfold, gravity down, power up, and power fold (stow) operation. No part of the lift platform shall exceed 6 inches/second during the lowering and lifting of an occupant, and shall not exceed 12 inches/second during deploying or stowing. The lift shall have a mechanical outboard safety wheel stop to prevent wheelchair from rolling off the platform during the lifting cycle. Successful bidder shall deliver the lift equipped bus with the type of lift equipment requested by the State. Suggested sources: Braun, Maxon, Ricon, or equal.

5. A manual safety override shall be provided that will remain operable. Lift shall have manual override instructions visible from inside and outside the bus with door open.

6. The entire lift assembly shall be installed inside the bus body and shall have adequate protection installed on all sharp corners or items that protrude into the passenger area to prevent accidental injury to passengers. Wall and floor mounting points shall be reinforced and shall be attached with fasteners having a thread locking feature. Lift installation shall insure that no lift rattling exists when the bus is operated while the lift is stowed.

7. A lift control interlock system shall be installed that shall ensure that the bus cannot be moved when the lift is not stowed and that the lift cannot be deployed unless the interlock is engaged [to meet ADA regulation in 49 CFR Part 38, Subpart B--Buses, Vans and Systems, §38.23, (b)(2)(I)]. The interlock system shall engage when the lift operation sequence is followed. Interlock operating instructions shall be included with the bus at delivery. An indicator light (red, labeled) shall be provided at the driver's station that is activated when the lift door is open and when the lift is in operation. Suggested Source: Intelligent Lift Interlock System (ILIS) by Intermotive Products or equal. An interlock override system shall be installed that allows service personnel to move the bus to a safe area for repairs.

8. All lift equipped buses shall display the international symbol of accessibility, one each on left and right side of the bus. Location shall be determined at pilot model inspection.

9. The active lift shall meet ADA requirements as well as these minimum requirements.

   a. Capacity 600 pounds minimum.

   b. Usable platform width 33" minimum.

   c. Usable platform length 50" minimum.

   d. Platform shall include automatic locking inboard safety wheel stop (minimum 6" height) and outboard safety wheel stops to prevent wheelchair from rolling off.

   e. Platform shall automatically stop at floor level.

   f. Platform shall automatically stop when lowered to ground level.

   g. Hand held controls shall be conveniently located on a flexible, cut resistant cable and

shall be mounted with access from inside or outside the bus. The cable shall be routed to eliminate being pinched in any moving parts and be wrapped with a flexible exterior protective conduit.

h. Platform, bridge plate, and area between bridge plate and aisle shall be skid resistant.

i. Bridge plate and platform shall be coated to resist rust.

j. Platform shall have horizontal handrails (one each side) on platform to assist passenger during lift operations. Handrails (yellow) shall fold automatically to prevent any obstructions into the bus passenger area.

k. Lift door operated interrupt switch shall prevent use of lift with lift door(s) closed. Heavy duty long life switches shall be used in this application.

l. The color of the lift shall coordinate with bus interior colors and be approved by the State.

m. Sharp corners of lift platform shall be padded (remove for lift use) when in the stored position.

n. The wheelchair lift shall comply with all federal, Americans with Disabilities Act (ADA), and Veterans' Administration regulations.

o. Lift platform shall be fitted with device to prevent the platform from touching or leaning against door after being returned to stored position when the lift assembly is not in use.

p. No part of the lift platform shall exceed 6 in/sec during lowering and lifting an occupant, and shall not exceed 12 in/sec during deploying or stowing.

III. WHEELCHAIR SECUREMENT AREA

A. The wheelchair securement system shall be installed according to ADA requirements. Securement location shall be installed as shown by the seating plan option and approved at pilot model production. Fold-away seating shall be provided for use when wheelchairs are not being carried as shown in floor plans. The integrated securement system shall restrain the occupant and the wheelchair separately and securely.

B. Wheelchair securement shall meet these minimum requirements:

1. Forward facing wheelchair tie down and occupant restraint shall consist of four floor attachment points for the chair and a lap belt/shoulder restraint for the occupant per location.

2. Securement floor anchorage points shall be anodized aluminum, stainless steel or other noncorrosive metal construction and consist of aircraft type insert pockets that can be flush mounted with the rubber flooring (Flanged "L" style track with end caps Q-Straint Q5-6100-FPD or equal). Floor anchorage points for one securement space shall be spaced at a minimum of 54" from front to rear. Floor anchorage points shall be located no closer than 8" from a stationary wall or obstruction (forward or rearward) that would hinder an operator from attaching the securement system. Anchorage points can be used for the front tie downs, the

rear tie downs, or can be shared by both.

3. Securement wall anchorage point for shoulder restraint shall be stainless steel or other aircraft quality noncorrosive metal. Wall anchorage device shall provide vertical adjustment (approximately 12") for differences in height of the secured mobility aid. Wall anchor shall be permanently fastened to the body structure in the wall according to the belt assembly manufacturer's installation instructions.

4. The belt components shall be permanently marked to identify their location as follows: "floor", "lap", or "shoulder". The four belts that attach to the wheelchair from the floor anchorage points shall use a simple speed hook end ("J" or "S"style) for chair attachment and have automatic heavy duty retractors with a hard metal cover and manual knob control. All floor attachment belts shall be the same and work in any of the four floor attachment points and be equipped with connector brackets for the lap belt assembly. Automatic self tensioning and self locking retractors with metal covers shall be part of the four floor belt assemblies for automatic belt tensioning. Belt ends with floor anchor attachments shall be easily identified for placement in the floor track.

5. All belt components shall meet ADA requirements and random static testing forces equal to:

rear belt assy.	6,000 lbs. each, minimum
front belt assy.	2,000 lbs. each, minimum
lap belt assy.	2,500 lbs. each, minimum
shoulder belt assy.	2,500 lbs. each, minimum
floor insert assy.	6,000 lbs. each, minimum

6. All components shall meet SAE J2249 requirements and be 30 MPH/20G impact tested.

7. Suggested sources: American Seating Advanced Restraint Module; Q'Straint Model Q-8100-A1L; Sure-Lok's Retraktor™ Systems for L track; or equal.

C. Storage pouches shall be provided for wheelchair restraints so that the restraints can be stored off the floor in the bus when not in use. Location of storage pouches will be determined at pilot model inspection.

IV. CHASSIS SPECIFICATIONS

The chassis shall have a pre-delivery inspection performed by a representative of the chassis manufacturer before the bus manufacturing process begins. A copy of the completed pre-delivery inspection form shall accompany the bare chassis during manufacture as part of the build order. All standard or optional chassis equipment to be included shall be as advertised by the manufacturer and factory installed and shall not consist of substitute or after market equipment. Optional chassis equipment not available from the factory may be dealer installed. The chassis shall meet the following minimum requirements:

A. Chassis

Commercial or Recreational Vehicle (RV) rated chassis shall be the highest Gross Vehicle Weight Rating (GVWR) available for the wheelbase and shall have one front axle with single wheels and one rear axle with dual wheels.

B. Tilt Wheel/Power Steering

Chassis shall be equipped with power steering and a tilt wheel steering column. The steering column shall be adjustable for various up and down positions of the steering wheel. The steering gear shall be a full hydraulic power assist type.

C. Wheelbase

Wheelbase shall be 158", minimum.

D. Engine

The engine shall be a gasoline V8 or V10, fuel injected, 350 CID (5.7ℓ) minimum.

E. Transmission

Heavy-duty, four-speed automatic cooled by an external "H.D. transmission oil cooler" in series with radiator cooler or equal (cooler capacity to match GVWR of bus).

F. Alignment

The bus shall have a four wheel alignment at final point of inspection, just prior to delivery to the transit agency and a copy of the work order indicating the camber, caster and toe-in settings at time of final inspection shall be provided with the bus at delivery.

G. Gross Vehicle Weight Rating (GVWR)

Front Axle Rating - 4,600-lb. minimum. Bus shall not exceed chassis manufacturer's rated front axle weight capacity.

Rear Axle Rating, - 9,450-lb. minimum. Bus shall not exceed chassis manufacturer's rated rear axle weight capacity.

Chassis GVWR - 14,050-lb. minimum. (see Purpose of Specifications, Section I)

H. Differential

Heavy-duty rear axle with full floating axles. Gear ratio shall allow buses to travel approximately 65 miles m.p.h. loaded, and not exceed manufacturer's recommended engine operating R.P.M. Axles shall be marked if synthetic oil is used.

I. Battery

The battery equipment shall be furnished by the chassis manufacturer where available. The dual batteries shall be maintenance free with reserve capacity of 400 minutes @ 80° F, CCA-1250, 12-volt minimum (dual Delco Group 31-1150 series or equal). The batteries installed in the bus must be a pair of matching units. The batteries must be fresh, fully charged units when the finished bus leaves the manufacturing plant. Batteries that have been in the bus during the manufacturing process which were allowed to become fully discharged for a period of time shall be replaced with fresh new batteries. Both batteries shall be mounted on a slide-out tray with nonmetal battery hold down secured with bolts. The tray, slides, and rollers shall be stainless steel. The slide-out tray shall be

mounted on properly supported mechanism with grease fittings, all of which shall have adequate capacity to support the battery equipment. The battery slide-out tray shall allow movement to permit full service of batteries outside of the bus body. The inside of the battery compartment shall be covered with a durable insulating material to prevent electrical shorts. The totally enclosed battery compartment shall be vented and the tray shall be coated with an acid resistant coating. The battery compartment must be located below the floor line with adequate reinforcement brackets mounted to floor supports. The battery compartment shall be fitted with an insulated standard exterior access door to prevent accidental grounding with hinge and flush pull-style latch(es) (SouthCo Model #M1-61-1 or equal), which match latches on other compartment access doors. The battery box compartment must be marked to say "battery inside".

J. Battery Cables and Grounds

Battery positive and ground cables shall be AWG size 2/0 minimum, fine stranded, flexible copper wire with permanently affixed cable connector ends with heat shrink tubing applied. All cable ends shall be fastened in a manner equal to the method used by the chassis Original Equipment Manufacturer (OEM). Positive cable ends at the battery shall use a protective cover or cap as an added insulator. Cable assemblies installed in place of chassis manufacturer's battery cables shall be sized to match the electrical system's maximum current draw to provide proper engine starting and operation of all systems.

An additional ground of the battery cable size shall be installed between the engine and chassis frame and between the transmission case and the chassis frame. One additional ground wire of the battery cable size shall be installed between the frame rails just ahead of the rear axle. The bus body shall be properly grounded with cables to the chassis frame in at least two places. Engine, body, and equipment grounds (properly sized) shall be installed to handle subsystem electrical capacity. Lift pump motor shall be grounded directly to chassis frame using a cable of the same size as the pump motor feed wire. All exterior lights and accessories added by the body manufacturer shall be grounded by an in-harness ground attached at a common grounding point. There may be a common grounding point in the rear of the bus along with a required grounding point at the fuse panel. For all ground wire connections; 1) paint shall be removed at the grounding point to provide a cleaned surface; 2) grounding wires and cables fastened to the frame or body structure shall use a bolt with nut installed in a proper sized hole; and 3) a coating of dielectric material shall be applied to the cleaned surfaces, cable ends, bolts, and nuts where each positive or grounding cable or wire is attached.

All buses shall be supplied with proper radio frequency (RF) suppression equipment to reduce radio interference and improve radio transmission and reception performance. High corrosion resistance and high conductivity braided ground straps shall be added: between the engine and the chassis frame of 1" width, minimum; between the engine and the firewall of ½" width, minimum; two between the frame and the body sections of ½" width, minimum; and between the separate body sections of ½" width, minimum. For all braided ground wire connections, paint shall be removed and a coating of dielectric material applied to the cleaned surfaces where each braided cable attaches as is required in other ground wire applications. All removable covers in the engine area including fiberglass hoods need to be shielded and RF grounded. All braided high corrosion resistance and high conductivity ground straps shall be as short as possible and shall use the negative battery cable attachment point (except those between separate body sections) as the termination point of the RF grounding.

K. Alternator

The alternator equipment shall be furnished by the chassis manufacturer where hot output will match system needs. This single system shall be a 12-volt dual-belt drive or serpentine belt drive with

internal or external voltage regulator. It shall be capable of maintaining the battery at a state of full charge under all operating conditions and equipment loads, 200 amp minimum. The alternator shall be supplied with proper radio frequency (RF) suppression equipment and have a ½" wide braided ground strap connected between the alternator frame and the engine block to reduce two-way radio interference. Any bracket modifications shall not reduce the strength of the mounting bracket. Chassis alternator equipment available that is unable to meet electrical needs may be replaced by Leece-Neville, PennTex, or equal. Any non-Original Equipment Manufacturer (OEM) alternator equipment installed on a vehicle by the body manufacturer shall be covered by a minimum warranty period equal to the chassis OEM alternator warranty. It is the responsibility of the manufacturer (bus supplier) to match the alternator performance to the vehicle's electrical system needs.

L. Fast Idle

The engine shall be equipped with fast idle control which includes manual and automatic control features. Fast idle shall not activate unless parking brake is set and transmission control is in neutral (N) or park (P). The control system shall have a manual switch, volt sensor, an indicator light, and activate automatically from voltage sensors. The system shall automatically deactivate when vehicle is shifted into gear and when the vehicle foundation brakes are applied. Chassis manufacturer's equipment, Vortec MD30-2500, Advanced Fast Idle System (AFIS) by Intermotive Products, Penntex Model PX-HI-(mod no) with time out module, or equal.

M. Brakes

Foundation brakes shall be a power-actuated four wheel disc type or a disc front/drum-type rear, anti-lock braking system. The system shall be the heaviest-duty available for stop and go operation. Brake system shall include a low brake warning system provided by chassis manufacturer.

1. Front Foundation Brakes: disc, 12.5" rotor with 45 square inches of pad lining minimum.
2. Rear Foundation Brakes: drum, 12.125" x 3.5" minimum or disc with rotor and pad of equivalent size to match axle weight rating.
3. Parking Brake - Heaviest-duty available from chassis manufacturer.

N. Fuel Tank

Fuel tank shall be 55-gallon minimum. On **gasoline models** where the fuel tank is mounted outboard of the chassis frame rail, the fuel tank shall have a protective cage for impact protection provided by the chassis manufacturer in compliance to regulations for school bus fuel tank impact protection. Fuel fill shall be protected from weather.

O. Hazard Flasher

Hazard flashers shall be the equipped with a dash mounted control (pull on/push off, lighted knob) switch with indicator (audible and light) and heavy duty transistorized flasher. Final location shall be determined at pilot model production. Suggested sources: Signal Stat, Hela, or equal.

P. Shock Absorbers

Chassis shall have gas filled shock absorbers front and rear, most heavy-duty available from chassis manufacturer.

Q. Suspension

1. The chassis shall be equipped with a heavy-duty spring front suspension to match the specified gross axle weight rating.

2. The chassis shall be equipped with a heavy-duty rear suspension fitted with a rubber shear spring suspension that works in conjunction with the OEM chassis leaf spring suspension to match the specified gross axle weight rating. The added suspension, consisting of a spring carrier assembly, a frame hanger assembly, a cross-member tube assembly, and a carrier spring assembly, shall be installed in place of the original spring hanger and shackle assembly. The frame hanger must bolt into the existing Original Equipment Manufacturer (OEM) spring hanger holes in the frame. The added suspension system must not alter the OEM gross axle weight rating. MOR/ryde® "RL" Suspension System or equal.

R. Stabilizer

Chassis shall have suspension stabilizers as provided by chassis manufacturer.

S. Wheels

Vehicle wheels (6) shall be 16.0" x 6.0" minimum. Wheels shall have stainless steel or brass valve stems a minimum of 1½" long.

T. Tires

All tires (6) shall be from the same manufacturer and be all season, tubeless, steel radial blackwall (LT225/75Rx16E), single front, dual rear. The tires shall be the largest size available from chassis manufacturer to meet the GVW rating.

U. Drive Shaft

The drive shaft shall be OEM and have guards of sufficient strength to prevent the drive shaft from striking the floor of the bus or the ground in the event of a tube or universal joint failure. Drive shaft guards (OEM chassis equipment preferred, or installed by the chassis manufacturer) shall be secured properly and be equal in materials and design to drive shaft guarding installed on a school bus chassis.

V. Wipers/Horn

Electric wipers shall be two speed, delay style, dual jet washers (electric), with manufacturer's standard arms and blades. The vehicle shall have two electric horns (high and low pitch).

W. Radiator and Cooling System

The cooling system shall have an extra cooling capacity radiator, water pump, pulley, and clutch-type fan with coolant recovery system (heavy duty installed by chassis manufacturer). Cooling system shall be winterized (minimum -35°F freezing point). Radiator removal instructions and estimated removal time shall be furnished with first bus to each agency. Coolant integrity shall be maintained throughout the manufacturing process to insure that the coolant, including additives, in the delivered vehicle is equal to the coolant installed at the chassis OEM factory.

X. Fluids

Fluids shall be checked and filled from inside front hood where application allows. Engine oil fill/check, transmission oil fill/check, and coolant fill/check shall be located for easy access.

Y. Engine Cover

The engine cover shall be insulated from engine heat, engine noise, and road noise. Driver's area noise level (at driver ear level) shall not exceed 82 DBA for any engine at a constant speed of 55 mph on a level roadway and shall be verified at pilot model inspection. Additional equipment added to the engine cover area shall not interfere with removal/installation of the engine cover.

Z. Exhaust System

The exhaust shall exit the rear of the bus on the street (left) side just forward of the left end of the rear bumper flush with the body and exhaust controlled down per FMVSS §393.83. The exhaust system must be installed to provide maximum ground clearance and departure angle at the rear of the bus.

V. OTHER ITEMS

A. Safety

The following safety items shall be provided on each vehicle:

1. A 12-volt 97-db sealed solid state electronic warning alarm that is readily audible from outside the bus when transmission is in reverse. The alarm shall: be steam cleanable; have passed a 1 million cycle test; and meet SAE J994, OSHA, Bureau of Mines and all State Regulations. The alarm shall be mounted with bolts and properly grounded in a protected location in the rear axle area (location shall be approved by the State). Suggested source: Manufacturer's standard.

2. The rear door shall have an audible alarm at driver area that is energized when the rear door latch handle starts to open and when the rear door is locked with the ignition in the on or accessory position.

3. A lift master switch with light (green and labeled) at driver's station, illuminated when switch is on.

4. An indicator light (red and labeled) at driver's station that is activated when lift door is open and when the lift is in operation.

5. An interlock system shall be provided to ensure that the bus cannot be moved when the lift is not stowed and that the lift cannot be deployed unless the interlock is engaged (to meet ADA regulation). The interlock system shall engage when the lift operation sequence is followed. Interlock operating instructions shall be included with each bus at delivery.

6. An automatic daytime headlight control system shall be provided. The system shall illuminate the headlights when the ignition switch is on and the headlight switch is off. The system shall activate automatically after engine start up with the headlamp switch off and shall deactivate automatically when the headlamp switch is on or the ignition switch is turned off. Suggested source: Chassis OEM.

7. A low profile electronic strobe light (white) with a clear lens and branch guard shall be provided (Meteorlite, Peterson, Target Tech Pulsator® 451, Truck-Lite, or equal). The light shall meet SAE J1318 requirements and be mounted centrally on the roof of the bus approximately 6 feet forward of the rear of the bus. The 12 volt light shall have a control switch in the driver's area. The light shall be approximately 4" in height, produce 80 (±10) double flashes per minute, and have a light intensity of 1 million candlepower with a current draw of approximately 1 ampere.

B. Electrical

1. Lift equipped buses shall have a circuit breaker with a manual reset in the lift feed circuit. The circuit breaker shall be mounted under the hood, with easy access, in the positive power cable leading to the lift power pack.

2. Install a 12 volt power point for hand held equipment in the driver's area.

3. All cable and wires added by the body manufacturer shall be continuous color coded and numbered. The manufacturer shall furnish complete as built wiring diagrams with integrated body and chassis wiring marked to show the codes used. Mating harnesses and harness connectors shall use matching wiring and coding unless chassis OEM wiring and coding is different from body manufacturer's. The wiring shall be designed to be a "plug and play"system where the harnesses and components are fastened through common standard terminal ends and connectors.

4. Electrical panels installed by the body builders shall be located for easy access. Circuit breaker circuit protection shall be standard but spade type fuses may be used when expressly required by the component manufacturer. The master electrical panel shall use a separate screw-type terminal system. Highest quality components available shall be used. Two spare electrical fuses that match fuses used on the bus body and chassis shall be supplied with the bus and stored in a box or spare circuit area at fuse box. All components shall be placed on the front of the electrical panel for ease of service.

5. All wiring added to chassis fuse block shall be securely fastened to prevent wires from being knocked loose or loosening from vibration. The manufacturer shall use wire raceways where needed. Wiring, harnesses, and raceways shall be supported at regular intervals by "P" clamps, or by other supporting hangers where necessary, and routed in separate hangers from heater hoses or air conditioning hoses. Body fuse/electrical panel shall be sufficiently sealed to prevent intrusion of dirt and moisture.

6. All wiring shall be heavy-duty; be properly grounded to body frame structure and the chassis; use a common grounding point; and be adequate for electrical system capacity. All wiring passage holes through engine cowl, floor area, and other partitions shall be thoroughly sealed to prevent dust and moisture intrusion and be sufficiently protected to ensure against wear from friction and the elements.

7. All accessories and accessory electrical equipment shall be wired through a constant solenoid energized when the bus's ignition switch is in "ignition on" or "run" mode. A master switch with light in the driver's control panel shall control this constant solenoid and act as a quiet switch overriding individual switches for accessories. This master switch is wired in series with the ignition switch to control the constant solenoid. The constant solenoid shall not control headlights, taillights, emergency lights, charging system voltage regulator energizer

lead, a fused power lead for the passenger door, and a fused constant power lead for all electronic control units' long term memory.

8. All control switches, relays, and circuit breakers used for the various electrical circuits shall have a current carrying capacity adequate for the circuit that they control and shall be properly marked for their function. The illuminated switch markings shall be permanent and not wear off with switch use. Control switches shall be positioned for easy access.

9. All added wiring shall be installed in a properly sized and supported split open-type loom or a properly supported raceway for protection. All wiring harnesses shall have adequate length to allow for harness flexing from supporting brackets and where harnesses connect to electrical equipment. Any wiring added by splicing into an existing chassis Original Equipment Manufacturer (OEM) harness or wire shall match modification standards set forth by the chassis manufacturer, such as Ford's QVM. Any added accessories or electrical circuits shall not interfere with nor back-feed into other electrical circuits.

10. Wiring added from OEM chassis wiring to rear lights, fuel tank, and/or other accessories shall be supported and protected from the ice and snow build-up. Wiring shall be inside bus where possible. Wiring to taillights and other exterior lights shall be long enough to remove assembly by 6" for service. Exterior connections shall be weatherproof positive lock connectors coated with dielectric grease (Weather-Pak, Metri-pak or equal).

11. Scotch lock wire connectors are not acceptable and shall not be used for wiring installation. Terminals shall be as follows:

    a. Machine crimped on wire ends shall be used on all harnesses and cable assemblies used in the production of buses. Harness assemblies shall have connectors matching a mating connector where harnesses attach to other harnesses, switches, or other electrical units. Connections made in any harness assembly shall use Sta-Kon®, or equal, disconnects and splice connectors where machine applied connectors cannot be used. Connectors shall be properly crimped with Sta-Kon®, or equal, tools and covered with heat shrink tubing. In-line fuse assemblies shall use spade type fuses in a Weather-Pak or equal holder and shall be located for ease of service.

    b. All exterior wiring connectors (plug-ins) including harnesses shall be weatherproof positive lock with the connector pins applied with the proper crimping tool (Weather-Pak, Metri-Pak or equal). All exterior ground connections, except factory supplied braided ground straps, shall have properly applied terminal ends with heat shrink insulation applied.

VI. ALTERNATE QUOTES (OPTIONS)

A. Air Conditioning System

OPTION A

1. a. The air conditioning system (AC) shall have front and rear evaporator units. The system shall be integrated with a compatible in-dash driver's area evaporator unit and compressor (chassis OEM) capable of delivering tempered air for windshield defrosting. The systems shall use refrigerant type R-134A and be warranted from date of delivery for one full year, minimum. The system shall be of sufficient capacity to

maintain interior temperature requirements stated in the test procedure for air conditioning systems during summer operation (see required certification in Vendor/Manufacturer Requirements, Section VII. C).

b. The front system shall be integrated with a compatible in-dash driver's area evaporator unit (complete front system may be Chassis OEM). The front system shall provide temperature control with sufficient cooling ventilators for driver comfort with no reliance on the rear system for front temperature control. Front and rear air flow and temperature shall be controlled by separate switches on the driver's control panel or dash panel. Front and rear systems shall have separate fan controls.

2. Compressor: There shall be one engine driven air conditioning compressor of nominal 10 cu. in. displacement (may be chassis OEM). Hose end metal fittings connecting hoses to the compressor shall be electro-coated steel that pass the ASTM D117 1000 hour Salt Spray test. The compressor clutch circuit shall be interrupted when abnormal pressures are detected by the pressure monitoring switches. Low pressure switch shall be located between expansion valve and compressor in the low pressure side of the system. The high pressure switch shall be located between compressor and condenser in the high pressure side of the system. Suggested sources: A.C. Industries, American Cooling Technology, Thermo King, Trans/Air, or equal.

3. Condenser: The system's condenser shall be skirt mounted. The condenser fans and motors shall be enclosed within the condenser housing. The housing shall be galvannealed with heat-fused powdered epoxy coating. The condenser coil shall be copper tube expanded into aluminum fins and vinyl-coated. Hose end metal fittings connecting hoses to the condenser shall be electro-coated steel that pass the ASTM D117 1000 hour Salt Spray test. High pressure cut out switches shall be wired into the clutch circuit. The condensers shall be equipped with 10" axial fans dynamically balanced with permanent magnet totally enclosed motors. The condenser shall blow air on an angle down from the bus chassis to help prevent re-circulation of hot air back through the condenser core. A refrigerant dryer shall be included and a sight glass where necessary. The condenser shall include winter guard kits approved by the State. Suggested sources for the condenser: A.C. Industries, American Cooling Technology, Inc., Thermo King, Trans/Air, or equal.

4. Evaporator(s)

a. The front (may be chassis OEM equipment) and rear evaporator shall have three-speed or variable speed continuous duty permanently lubricated blower motors (rear blower assembly rated at 1985 CFM, minimum). The evaporator cores shall be a copper coil with aluminum fins (four rows deep, minimum), galvanized heavy-duty frame and coil end sheets with a galvannealed drain pan. The evaporator expansion valve shall have "O" ring refrigerant connections. Suggested sources: A.C. Industries, American Cooling Technology, Inc., Thermo King, Trans/Air, or equal.

b. The driver's evaporator shall be controlled separately from the passenger area evaporator and shall have a three-speed or variable speed continuous duty permanently lubricated blower motor (may be chassis OEM equipment). The controls shall include an on/off switch and a three-speed blower switch. The in-dash unit shall not interfere with removal or replacement of the engine cover or be blocked by the entrance door control mechanism.

c. The passenger area evaporator system shall be separately controlled from a control station at the driver's position. The controls shall include an on/off switch and a three-speed or variable speed blower switch.

5. The components of the air conditioning system shall be readily accessible for maintenance. Service/charging ports shall be accessible without removing any other component or item. The refrigerant hose construction shall comply/exceed SAE specification J2064 Type D or E. The construction of the hose shall include a nylon-based thermoplastic inner liner reinforced with two separate layers of textile yarn and a cover consisting of a synthetic elastomer in order to reduce incidences of chaffing, cuts, and ruptures with adequate extra length for flexing where connected to compressors and other components. Refrigerant fitting construction shall comply/exceed SAE specification J2064 Type D or E. All refrigerant hose end fittings shall be electro-coated steel that will pass the ASTM D117 1000 hour Salt Spray test. The hose coupling end of all fittings shall include two hose barbs and two areas of elastomeric or HNBR seals. Refrigerant hose clamp construction shall; comply/exceed SAE specification J2064 Type D or E, be made of stainless steel to ensure coupling integrity, properly align hose end fitting, and clamp the hose directly over the elastomeric or HNBR seals. Refrigerant hose fittings shall be Aeroquip E-Z Clip system, Carrier/Transicold Quick-Klik system, or equal.

6. The wiring shall meet all applicable specifications (see Section V. B.). The evaporator and condenser wiring (power and ground circuits) shall be properly sized to provide full battery voltage to each electrical unit.

7. Air conditioning electrical circuits shall be protected with automatic circuit breakers or thermal relays.

OPTION B

1. Condenser: The system's condenser shall be roof mounted and meet all of the requirements for the air conditioning system in Option A above.

B. <u>Manual Entrance Door</u>

1. The manufacturer shall provide a heavy duty manually-operated passenger entrance door with control handle located in the driver's compartment within easy reach of the driver. The passenger entrance door shall not extend below the step frame. All exposed door frame structure shall be made of 304 stainless steel acid-etched, coated with zinc based primer and powder coated OEM white (including the fasteners). The door shall be located on the right side of the vehicle behind the right front wheel. The entrance door shall provide a 30" clear width opening, minimum, with all handrails installed. Door opening height from the top of the first step to the door header shall be a minimum of 76".

2. Passenger entrance door shall be a double-folding, split-type double leaf swing door. This door shall have a flexible soft rubber cushion on the meeting edge 1½" in width, minimum. The door glass shall be see-through, tinted (AS-2) safety glass. Under all operating conditions and vehicle speeds, an airtight and dust-proof seal shall be formed between the door and the stepwell, between the door and body opening, and between the door leaf sections.

3. A method shall be provided to lock the bus when the bus is parked.

C. Diesel Engine

The optional engine in the diesel-powered drive train shall be an 8 cylinder (V-8 OHV) turbocharged diesel engine 6.0ℓ minimum with a cold climate package. Chassis OEM electric, 110 volt, 1000 watt, engine block heater with cord and covered receptacle shall be required for all diesel engines. Driver's area noise level shall not exceed 82 decibels at a constant speed of 55 mph on a level roadway and shall be verified at pilot model inspection.

All buses with diesel engines shall be equipped with an auxiliary heater system that shall be able to preheat, provide supplemental heat, and maintain heat for the engine and interior of the bus. The auxiliary heater systems shall be supplied as a heated coolant model with a seven-day electronic timer control. The seven-day timer control shall be capable of a two hour preheat, minimum and be capable of continuous run control when the key is on with the engine running. The system control unit shall be located in the driver's area of the vehicle. The heater system shall be complete with all fuel and electrical controls, exhaust system, and standard warranty. The heater shall be a 12 volt unit with a fused power supply and with protection for high and low voltage conditions. The auxiliary heater system shall meet FMVSS 301 fuel system integrity requirements. The heating unit shall be fueled by the vehicle's primary fuel supply. The electrical connection shall be a one piece harness from the control switch to the heating unit with weather-pak or equal exterior connections.

The heated coolant model shall be a self-contained unit mounted under the bus near the rear heating unit, and connected to the heater hoses leading to the rear heating unit. It shall be in an enclosure supplied by the auxiliary heater manufacturer, be installed so that adequate ground clearance exists below the heater enclosure box, be easily accessible for servicing, be weather resistant, and be complete with mounting brackets/hardware and coolant circulator pump. The coolant circulator pump shall provide a minimum flow of 3.5 gallons per minute. The heated coolant system units shall have safety features for temperature regulating and overheat shut down switches. A seven day digital timer shall be used to control operation. The coolant heater shall control coolant temperature up to 176°F with a high and low heat level and have a heat output of 17,000 BTU/hr minimum. The auxiliary heater exhaust shall be connected to a section of rigid exhaust pipe with a down sweep that exits just below the heater enclosure toward the rear of the bus. Suggested source: Espar Hydronic 5 (diesel heated coolant), Webasto, or equal.

D. Auxiliary Air Heater System

The auxiliary air heater systems provided shall be able to preheat, provide supplemental heat, and maintain heat for the interior of the bus for all engines. The auxiliary heater systems shall be supplied as a heated air model with an on/off, variable temperature, and with a seven-day electronic timer control. The seven-day timer control shall be capable of a two hour preheat, minimum and be capable of continuous run control when the key is on with the engine running. The system control units shall be located in the driver's area of the vehicle. The heater system shall be complete with all fuel and electrical controls, exhaust system, and standard warranty. All heaters shall be 12 volt units with a fused power supply and with protection for high and low voltage conditions. The auxiliary heater system shall meet FMVSS 301 fuel system integrity requirements. The heating units shall be fueled by the vehicle's primary fuel supply--either gasoline or diesel. The electrical connection shall be a one piece harness from the control switch to the heating unit with weather-pak or equal exterior connections.

The heated air model (with mounting brackets) shall be a self-contained unit placed in the passenger area either between the bus seat and bus floor or in a clear free space in the interior of the bus (placement shall be decided at the time of installation). The heated air system shall be a variable

output, multi-stage heater for all engines. The heating unit shall have, 1) 16,000 BTU heat output, minimum (high heat setting), 2) 100 CFM of air delivery, minimum, and 3) automatic cycling between heat output stages. The heating unit shall be operated from the vehicle driver's area control unit. The unit shall have automatic overheat protection. All heater systems' fuel and exhaust connections shall be made outside the passenger compartment of the bus. The auxiliary heater exhaust shall be connected to a section of rigid exhaust pipe with a down sweep that exits just beyond the body side. The heating unit shall be fueled from the vehicle's primary fuel supply--either gasoline or diesel. Suggested source: Espar Inc. D5LC/B5LC (diesel/gas, heated air) Webasto or equal.

Option A: Provide an auxiliary air heater for a gas powered bus as specified above.

Option B: Provide an auxiliary air heater for a diesel powered bus in lieu of the auxiliary coolant heater included with the diesel option. When an auxiliary air heater is installed on diesel powered vehicles, the engine shall be equipped with a 1000-watt 110-120 volt-A.C. OEM installed engine block heater with cord and covered receptacle. Engine block heater electrical cord receptacle shall be mounted for convenient access and protected from the weather (location to be determined at pilot model production).

E. Power Seat Base for Driver's Seat

Provide a six-way power seat base for standard driver's seat that allows for fore and aft, up and down, front tilt and rear tilt for the driver. Suggested source: Chassis Original Equipment Manufacturer (OEM) Deluxe Power Seat Base.

F. Destination Sign

A 12-volt destination sign with a motor driven movable sign curtain mechanism shall be provided which meets ADA requirements (one front sign and one side sign). The sign curtain shall be approximately 36" wide and illuminated. The sign box shall have a door to open for the operator to view the sign curtain position. The door shall be positioned for ease of driver operation. A restraint shall be installed to prevent the storage door from opening beyond 105° when the installation allows the door to swing open. Suggested source: Trans Sign Model D-3110 or equal.

G. Ceiling Handrails

1. Two full length transit-type ceiling handrails shall be provided and securely attached to roof structure on all buses used in fixed route service (line haul). The handrails shall be a minimum of 1¼" outside diameter, brushed finish, stainless steel including mounting brackets and fittings. All handrails shall meet ADA requirements for position and size.

2. All handrail mountings shall have reinforcement plates welded to or imbedded in structure behind surface panels of sufficient strength to withstand passenger force. Final locations shall be determined at pilot model production.

H. Engine Shutdown System

A warning/engine shutdown system for gasoline and diesel engines which shall be capable of monitoring oil pressure, engine temperature, and engine coolant level and which shall sound an alarm and shut down the engine when: 1) low oil pressure occurs, 2) high coolant temperature occurs, or 3) low coolant level occurs. The warning/engine shutdown system shall include an audible alarm (with warning light) and visual indicator lights (oil pressure, eng temperature, and the like) in the driver's

area. The visual indicator lights shall be labeled to define the source of engine shutdown as a system diagnostic aid. The low coolant probe shall not be installed in the coolant overflow/recovery container. Suggested source: Murphy System, Chassis OEM System, or equal.

I. Donation Box

A donation box (to replace the farebox) shall be mounted on an adequately braced stanchion; shall be located over a flat floor surface near the driver; and shall be accessible to passengers entering the bus (meet ADA requirements). The lockable donation box shall be supplied with two keys. (Location shall be approved by the State at pilot model inspection.) Suggested source: Main Farebox Model C91M or equal.

J. Farebox Electrical Prep

Electrical connections and wiring only (no farebox) along with support stanchion shall be supplied to the area where the standard farebox would be mounted (location shall be approved by the State at pilot model inspection).

K. Rear Emergency Exit Window

1. Each bus shall be equipped with a rear exit window with a minimum of 1,200 square inches of glass area (opening 20" by 60", minimum). The rear window shall have a latching device for opening from inside the bus which may be quickly released but designed to offer protection against accidental release. Lever-type latches shall be used for rear emergency exit windows and shall secure the windows tightly shut, shall be easily operated, and shall not unlatch due to vibration during bus operation. The latches shall be made of non-corrosive materials and be designed for minimal maintenance needs. The rear window exit shall meet federal requirements (FMVSS 217). The rear window exit shall have an audible alarm at the driver's area energized when the window starts to open with the ignition on. A clear full width path of 16" minimum height shall be provided to the rear exit window. No objects shall be placed in the bus which restricts passageway to the rear exit window. All emergency exits shall be marked with instructions for proper use.

2. The bus rear exit window shall have a glue-on wide angle view Fresnel lens to improve vision directly in back of bus. Suggested source: Vangard made by Optical Sciences Group or equal.

L. Paint – Optional Designs

1. The bus color shall be OEM white with no stripe. This will be a deduction to the OEM color and stripe requirement.

2. In addition to the two color scheme, the bus shall have an additional stripe painted a single color. This will be a price increase. An example would be: an OEM white bus with a 10" belt stripe having a second stripe applied.

3. In addition to the two color scheme, the bus shall have the roof painted a different color. This will be a price increase. An example would be: an OEM white bus with a 10" belt stripe having the roof painted red.

4. The bus shall be painted a full body color other than OEM white. This will be a price

increase. An example would be: a bus painted all red.

M. Folding Platform Active Lift (Platform) (Meet ADA Requirements)

The folding platform lift shall meet all of the lift requirements stated in Part II, Section Y except that the lift shall have a platform that folds in the center during stowage and the lift platform is 32" usable width. The folding platform lift provides an unobstructed view from inside the vehicle through the lift opening., Braun Vista, Ricon KlearVue model K-5005 ADA, or equal.

N. Rear Five Place Passenger Seat

On buses with a rear exit window, forward facing seating for five passengers shall replace two double place forward facing seats at the rear wall of the passenger compartment increasing the passenger capacity by one. The five passenger seating shall be available for buses with the lift forward of the rear axle (no wheelchair lift and/or securement location at the rear of the bus). The five passenger seat shall be 88" minimum width and shall comply with all requirements specified in Section II., Part P., Item 4. and Item 5. of these specifications but without grab handles. The seats shall be of the same design as the other passenger seats.

O. Two-Way Radio Antenna/Power

All material and labor required for a pre-installation package for two-way radio equipment shall be furnished by the manufacturer. All equipment and accessories installed as part of the vehicles shall have no measurable radio frequency (RF) interference. All equipment installed on the vehicle must operate in its normal mode while radio transmissions are being made from an on board transmitter producing 100 watts or more of transmit power while operating in the range of 43 Megahertz (Mhz) to 900 Mhz. Proper RF suppression to eliminate interference shall be provided by the manufacturer in any equipment and accessories that can produce interference. The vehicle frame and body shall be designed to provide no measurable radio interference (shielding) for improved radio emissions and reception performance. Certification of radio reception and transmission performance by the vehicle manufacturer as well as locations of components for installation of the radio packages for 43 Mhz to 900 Mhz shall be completed at pilot model production.

1. Two (2) antenna mounting plates (.060" steel minimum) shall be mounted in the roof of the coach for the purpose of providing a connection to the ground plane and providing a secure mount for the antenna. On buses with a metal exterior skin, one plate shall be mounted forward of the roof escape hatch on the roof center line and the second plate shall be mounted to the left (driver's side) of the first plate just above the coach side window. For vehicles with FRP composite bodies, the mounting plates may be installed in the front cap of the vehicle--one centered in the roof section of the cap and one centered in the left (driver's) side section of the cap. Each mounting plate must be properly positioned in relation to its ground plane to ensure proper operation of an antenna installed at that mounting point. The total thickness of the exterior shell of the bus in the mounting plate area including the mounting plate shall be no more than ½".

2. Two (2) antenna ground planes, which are required for proper antenna operation, shall be mounted in each vehicle. All ground planes shall be radio frequency (RF) grounded to the nearest metal portion of the body structure using high corrosion resistance and high conductivity braided ground straps of the proper size (⅜" minimum width). Ground planes shall provide a comparable area of radio transmission coverage whether vehicles have a metal exterior body covering or have a FRP composite exterior. At each antenna access opening

and mounting plate area, the ground planes shall be of proper size and shape for proper communication operations. The ground planes shall be a solid piece and operate over the range of frequencies from 43 Mhz to 900 Mhz. The ground plane material used by the manufacturer must be a durable material that can be connected to the antenna mounting plate and grounded to the chassis frame. The ground plane shall be of the proper size to protect passengers in the vehicle from unnecessary radiation from the transmitting antenna at the vehicle's antenna access openings.

3. A 6" high branch deflector shall be installed on the roof of the vehicle 6" forward of the antenna mounting area.

4. Two threaded type access holes with covers approximately 6" in diameter shall be installed in the interior of the bus at the antenna mounting plate locations, one in the interior ceiling forward of the roof escape hatch and the second directly to the left (driver's) side above the side window line of the coach on buses with a metal exterior skin. For vehicles with FRP composite bodies, the screw-type access holes may be installed in the front cap of the vehicle, one centered in the roof section of the cap and one centered in the left side section of the cap. Adequate space shall be provided between the installed access cover and the inner body to allow for routing of the antenna lead and its connections without interference.

5. A concealed thin wall plastic conduit, 5/8" I.D. minimum, (with antenna cable pull wire) shall extend from the antenna mounting plate locations (roof and above side window or in front cap) to the mounting location for the radio. When installed, the conduit shall have no sharp or right angle bends or be distorted to prevent insertion of the antenna lead. For both antenna mounting plate locations, sufficient space shall be left at each end of the conduit to allow easy removal and replacement of the devices attached to the cable. The antenna pull wire shall terminate behind the driver's seat with 2 feet of extra length extending into the coach interior.

6. 12-volt power for the two-way radio - The positive lead (red 8 ga wire fused at 40 amperes) for the radio connection shall be provided directly from the battery positive post. The ground lead (black, 8 ga) shall be connected directly to the chassis frame with a bolt and nut for fastening. Proper suppression equipment shall be incorporated in the vehicle's electrical system to eliminate interference with radio and television transmission and reception shall not cause interference with any electronic system on the coach. The radio power and ground leads shall terminate directly behind the driver's seat with 12 feet of extra length extending into the coach interior.

7. A split loom or other flexible wire race-way (1" minimum) shall be installed from the radio location to the dash mounted microphone control location.

8. The modesty panel behind the driver shall be used for radio mounting and shall be constructed to support 60 pounds of weight. To provide for radio mounting, a 5" minimum distance shall be provided between the driver's seat and the modesty panel when the driver's seat is in its most rearward travel position.

P. Smooth Anti-slip Flooring

1. The entire passenger area including the wheelchair securement area, entrance steps and stepwell area shall be overlaid with smooth, slip resistant flooring material. The resilient sheet flooring system (2.2mm thickness minimum) shall be a high quality vinyl constructed with aluminum oxide , silicon carbide grains and PVC chips blended in a high quality wear

layer with a non woven polyester/cellulose backing with glass fiber reinforced center scrim, Altro® Meta, Chroma or equal. The flooring shall extend up the sidewall to the seat rail line and shall be coved at the floor/wall joint to form a smooth water tight transition. Installation of flooring must be done strictly according to the flooring manufacturer's directions using the proper accessories, tools, and adhesives.

2. Step treads shall be one-piece resilient sheet flooring system matching the passenger compartment flooring, Altro Safety Step System or equal. All step edges (nosings of step tread material) shall have a band of bright yellow contrasting color running full width of the step. Step tread to stepwell joints shall be sealed to prevent intrusion of moisture and debris. An aisle width standee line of bright yellow contrasting color shall be in the aisle just behind stepwell (must meet ADA contrast requirement).

Q. Entrance Stepwell Heater

The entrance stepwell shall include a 12-volt electric heating element/unit for the lower step to prevent icing of entrance steps. The low voltage step heater shall consist of one or more wire elements laminated and vulcanized between two plies of .026" silicone rubber impregnated fiberglass cloth to maintain an approximate temperature of 160° F with a low temperature (30°F) sensing switch (Warm Welcome® by Lighthouse International, Ltd., or equal). The entire lower step heating unit with power wires shall be enclosed between the stepwell and the step tread (beneath the step tread) of the lower step. Lead wires shall be loomed, supported by brackets, and protected by grommets where they pass through structure. The sensing switch (thermostat) shall be integral with the power feed wire and located outside the stepwell in a protected area under the bus or be integral with a separate short harness that plugs into the feed wire under the bus.

R. Natural Gas Application

The bus shall accept Compressed Natural Gas (CNG) or Liquified Natural Gas application if required for fleet compliance by federal Environmental Protection Agency (EPA) alternate fuel application guidelines. Availability of this option is for demonstration or experimental units only (special purchase by the State). This option will not be used in the evaluation of the total bid and is for information only.

On buses ordered with alternate fuels options (propane, CNG, etc.) auxiliary heater systems installed shall meet the same specifications for the systems operating on diesel fuel. Additionally, a diesel fuel tank shall be added with a minimum working capacity of 8 gallons with a 1 gallon reserve. All heated air models shall have a 12-volt heater booster pump (Bergstrom 863040 or equal) installed in the coolant line forward of the first rear heater. Additional equipment needed for auxiliary heater shall be included in the option.

VII. VENDOR/MANUFACTURER REQUIREMENTS

A. Vehicle Information Furnished - Vehicle information in this section shall be reviewed at the pre-pilot model review meeting and at final pilot model production. Vehicle information identified by " * " shall also be supplied with each bus at delivery where indicated.

1. Copy of manufacturer's statement of origin for a vehicle.

2.* Warranty papers for chassis, body, and additional equipment with each bus at delivery.

3.* As built drawings showing wiring schematics of all electrical circuits, body, and chassis with each bus at delivery.

4.* Operator's manual for vehicle and all add-on equipment with each bus at delivery.

5.* A complete set of repair manuals for the chassis and a manufacturer's parts manual for the body, and auxiliary equipment for the first bus of each model year delivered to each transit agency.

6.* Bus operating instructions showing controls and operation on a VHS video cassette tape for the first bus delivered to each transit agency.

7.* Standard manufacturer's production option sheet(s)/decal(s) for chassis and body shall be installed in standard location, with no holes or rivets obscuring writing and numbers. Sheet shall include rear axle ratio. A paper copy of the service broadcast sheet for chassis shall also be provided with each vehicle at delivery.

8.* Maintenance and inspection schedule incorporating the required maintenance and inspection of the basic vehicle and its subsystems (i.e., wheelchair lift) with each bus at delivery.

9. Detailed description and specifications of the frame structure, roof structure, side sheathing, inside panels, with particular reference to material used.

10. Detailed drawing on how body structure is mounted on chassis frame.

11. Certification that the seating floor anchorage and floor fasteners shall meet all applicable FMVSS including FMVSS 207, 208, 209, and 210.

12.* Proof of bus suspension alignment (work order or bill) at final vehicle inspection and with each bus at delivery. Four wheel alignment shall include adjustments to front and rear suspension and steering parts so that axle alignment, camber, caster, and toe settings are within manufacturer's desired limits.

13. Proof of undercoating (warranty) at final vehicle inspection and with each bus at delivery.

14.* Front end and rear towing instructions with each bus at delivery

B. Manufacturer Quality Control

Vehicle contractor/manufacturer shall provide a plan for quality control during vehicle construction and include the plan as part of the bid documents (ISO 9001:2000 Certification). Vehicle contractor/manufacturer shall also provide the name of the chief of quality control for vehicle construction.

The contractor shall establish and maintain an effective in-plant quality assurance organization. It shall be a specifically defined organization and should be directly responsible to the contractor's management and completely independent from production. The quality assurance organization shall exercise quality control over all phases of production from initiation of design through manufacture and preparation for delivery. The organization shall also control the quality of supply articles. The quality assurance organization shall verify inspection operation instructions to ascertain that the manufactured product meets all prescribed requirements. The quality assurance organization shall

detect and promptly assure correction of any conditions that may result in the production of defective transit vehicles. These conditions may occur in design, purchases, manufacture, tests or operations that culminate in defective supplies, services, facilities, technical data, or standards. The contractor shall maintain drawings and other documentation that completely describe a qualified vehicle that meets all of the options and special requirements of this procurement. The quality assurance organization shall verify that each transit vehicle is manufactured in accordance with these controlled drawings and documentation.

The contractor shall ensure that all basic production operations, as well as other processing and fabricating, are performed under controlled conditions. Establishment of these controlled conditions shall be based on the documented work instructions, adequate production equipment, and special work environments if necessary. A system for final inspection and test of completed transit vehicles shall be provided by the quality assurance organization. It shall measure the overall quality of each completed vehicle. A system shall be maintained by the quality assurance organization for identifying the inspection status of components and completed transit vehicles. Identification may include cards, tags, or other quality control devices. Inspection stations shall be at the best locations to provide for the work content and characteristics to be inspected. Stations shall provide the facilities and equipment to inspect structural, electrical, hydraulic, and other components and assemblies for compliance with the design requirements. Stations shall also be at the best locations to inspect or test characteristics before they are concealed by subsequent fabrication or assembly operations. These locations shall minimally include, as practical, under-body structure completion, body framing completion, body prior to paint preparation, water test before interior trim and insulation installation, engine installation completion, under-body dress-up and completion, vehicle prior to final paint touch-up, vehicle prior to road test, vehicle final road completion and presentation to resident inspectors. Tests shall be performed by the vehicle manufacturer to ensure that the unit is dustproof, water-tight, fumeproof, and that all vehicle fluids are per specifications. The quality assurance organization shall be responsible for presenting the completed vehicle to the resident inspectors. Sufficiently trained inspectors shall be used to ensure that all materials, components, and assemblies are inspected for conformance with the qualified vehicle design.

The State may be represented at the contractor's plant by resident inspectors. They shall monitor, in the contractor's plant, the manufacture of transit vehicles built under this procurement. The contractor shall provide office space for the resident inspectors in close proximity to the final assembly area. This office space shall be equipped with desks, chairs, outside and interplant telephones, and other items sufficient to accommodate the resident inspector staff. Inspectors shall have lifting equipment available for raising vehicles for under vehicle inspections.

C. Air Conditioning Certification

Vehicle manufacturer shall provide air conditioning system performance certification (conducted by an independent laboratory or testing agency and supported by documentation of the actual test on the pilot model vehicle) that the air conditioning system installed in the vehicle meets or exceeds performance levels required by these specifications.

1. The air conditioning system performance testing shall be conducted using a heating chamber of sufficient size to contain the basic vehicle, to heat soak the vehicle at 100°F for 4 hours minimum, to simulate sun load entering windshield, and to maintain 100°F exterior temperature continuously after heat soak during testing. An interior temperature of 72°F (±3°F) must be reached within 30 minutes from the beginning of the test. Engine speed shall be maintained at 1300 RPM (± 200 RPM) during the test.

2. Instrumentation for temperature monitoring of the bus interior shall be a minimum of 3 points in the passenger area 30" above the floor - one in driver's area at knee level, and one at the evaporators' air inlets and air outlets. Instrumentation and recording equipment shall be able to monitor all points, record data at one minute intervals, and print a data report.

D. Heating/Ventilating Certification

The vehicle manufacturer shall provide test results that certify the performance of the heating/ventilating system as installed in the vehicle meets or exceeds performance levels required by these specifications. The test should be conducted by an independent laboratory or testing agency and supported by documentation of the actual tests on the pilot model vehicle. Testing may be performed in natural cold climate conditions.

1. The heating system performance testing shall be conducted using a cold chamber of sufficient size to contain the basic vehicle; to cold soak the vehicle at 0°F for 12 hours; to maintain 0°F continuously after cold soak during testing; and be equipped with a chassis dynamometer to simulate road operation under conditions encountered in normal transit operations with a 20% load of passengers, 1 wheelchair and a bus driver. *An average interior temperature of 60 °F must be reached* within 30 minutes from the beginning of the test. After initial warm-up while the bus is in passenger service, the front and rear heavy-duty heating system shall be sufficient to maintain a minimum of 64°F at knee level throughout interior of bus and at the driver's foot space when the outside temperature is 0°F. The test procedures shall be completed: 1) to show actual temperature rise from static parked condition; 2) to simulate an average bus route; and 3) to measure coolant flow rates in the heater circuits at idle and at operating speeds.

2. The test is to be: 1) warm-up of 15 minutes with 8 minutes @ idle and 7 minutes @ 35 mph road load; 2) idle bus, 3 minutes [passenger boarding - door open for 1 minute]; 3) run @ 25 mph for 5 minutes, run @ idle 3 minutes [passenger boarding - door open for 1 minute]; 4) run @ 25 mph for 5 minutes, run @ idle for 8 minutes [wheelchair boarding - doors open for 4 minutes]; 5) 2 cycles of run @ 25 mph for 5 minutes, idle 3 minutes [passenger boarding - door open for 1 minute]: 6) run @ 25 mph for 5 minutes, run @ idle for 8 minutes [wheelchair boarding - doors open for 4 minutes]; 7) 2 cycles of run @ 25 mph for 5 minutes, idle 3 minutes [passenger boarding - door open for 1 minute]; 8) run bus at 35 mph for 6 minutes; and 9) idle bus, 5 minutes. Total test operation cycle of 95 minutes.

3. Instrumented monitoring for the bus interior temperature shall be a minimum of 3 points located front, center, and rear in the passenger area 30" above the floor -- one in driver's area at knee level 22" above the floor, at front heater's air inlets and air outlets, and at rear heater's air inlets and air outlets. Other temperature monitoring points shall be: engine operating (coolant); engine oil; engine outlet to heater; heater return at engine or radiator; and exterior ambient. Coolant flow shall be monitored from the engine outlet to the heaters and for coolant flow through each circuit to the heater unit. Normal engine operating temperature shall be reached 30 minutes into the test and shall be maintained throughout the performance test. Supplemental heat shall be supplied to raise engine to normal operating temperature if testing conditions fail to raise the engine to normal operating temperatures at 30 minutes into the test. The standard used for this test for normal engine operating temperature is determined by the engine manufacturer's specifications. Instrumentation and recording equipment shall be able to monitor all points, record data at one minute intervals, and print a data report.

D. Purchaser Inspection

The purchaser reserves the right and shall be at liberty to inspect all material and workmanship at all times during the progress of the work, and shall have the right to reject all material and workmanship which do not conform with the specifications or accepted practice. Where a resident inspector is used, upon the request to the quality assurance supervisor, the resident inspectors shall have access to the Contractor's quality assurance files related to this procurement. These files shall include drawings, material standards, parts lists, inspection processing and records, and record of defects.

E. Warranty

Warranty shall become effective on the date the vehicle is placed into service based upon agency notice to contractor. Warranty service performed at the manufacturer's facilities at the manufacturer's request shall have all costs covered by the manufacturer. Warranty for the vehicle shall be the following as a minimum:

1. Three (3) years/36,000 miles on chassis.
2. Three (3) years/36,000 miles on transmission.
3. Three (3) years on body structure, exterior and paint.
4. Eighteen (18) months on lift.
5. All wiring shall be warranted for 1 year from date of delivery.
6. Manufacturer's standard warranty of one (1) year 12,000 miles, minimum, on other add-on components and items.
7. The chassis, body, and all add-on components shall be warranted by the successful contractor.

F. Miscellaneous

1. The vendor shall furnish the State with the delivery schedule of chassis to vendor and a delivery date of completed vehicles within 30 calendar days from date of order.
2. Any in-line equipment changes shall have prior written approval of the State.
3. The vendor shall supply the vehicle turning radius: wheel-to-wheel and wall-to-wall.
4. The vendor shall furnish warranty procedure instructions and necessary forms used by customers to obtain necessary warranty repairs.
5. The manufacturer(s) shall produce as pilot models the first two buses ordered by the State for its transit agencies. The buses shall be: 1) one gas powered vehicle, 2) one diesel powered vehicle, 3) each lift equipped, 4) each air conditioned, and 5) each the largest sizes on request by the transit agencies. All necessary testing and equipment placement shall be performed on the pilot models before final inspection/acceptance by the State. The pilot models shall serve as a standard for the following units but shall not relieve the contractor from an obligation to manufacture all units in compliance with all specifications.

VIII. BID DOCUMENTS

The bidder shall supply a copy of the following documents with the bid quotation:

A. A floor plan of the bus shall be provided indicating dimensions and showing the interior layout of the bus. The plan shall include wheelchair placement, stanchion locations, engineering calculated loaded bus axle weights, and be drawn to scale for all configurations.

B. Detailed engineering drawing for the design of the entrance door and door opening device (with drawings).

C. Detailed engineering drawing for the design of the entrance step configuration (with drawings).

D. Roof, sidewall, and flooring drawings showing structure and structural specifications indicating metal size and type used. Include side sheathing and inside panels.

E. Detailed engineering drawing on how body structure is mounted on chassis frame.

F. All bidders must supply manufacturer's technical specifications for wheelchair lifts and wheelchair restraints. Manufacturer's sales literature is acceptable if it contains the technical specifications.

G. A description of the manufacturer's chassis (specifications).

H. The warranties for body, chassis, and drive train.

I. A copy of the Bus Rollover Protection Test (FMVSS 220) results of the bus offered as specified in the bid.

J. The required Federal Transit Administration (FTA) clauses shall be attached to bid quotation.

K. The Michigan Bus Specification forms completed in detail.

L. The technical data sheet including flammability and smoke emissions for the seat covering material supplied.

M. Seat frame Salt Spray, humidity and impact resistance tests' results

N. Certification test data showing that the seats, the seat belts, and the installation are in compliance with FMVSS-207, 208, 209, and 210 where applicable for the bus model being offered in this bid.

O. Certification that the wiring and the switches for air conditioning and all add-on components are adequate to withstand transient loads expected.

P. A copy of the dealer agreement between the Bus Manufacturer and the designated dealer.

Q. Certification that the bus model offered is a 5 year or 150,000 mile bus and will meet the requirements of Federal Register Rules and Regulations 49 CFR Part 665, Bus Testing Program. Stating from § 665.13 Test Report and Manufacturer Certification, Section (b)(1), "A manufacturer of a new bus model or a bus produced with a major change in component or configuration shall provide a copy of the test report to a recipient during the point in the procurement process specified by the recipient".

IX. TABLE 1

1. Materials tested for surface flammability should not exhibit any flaming running, or flaming dripping.

2. The surface flammability and smoke emission characteristics of seat cushion materials should be demonstrated to be permanent after testing according to ASTM D–3574 Dynamic Fatigue Tests I$_5$ (Procedure B).

3. The surface flammability and smoke emission characteristics of a material should be demonstrated to be permanent by washing, if appropriate, according to FED–STD–191A Textile Test Method 5830.

4. The surface flammability and smoke emission characteristics of a material should be demonstrated to be permanent by dry cleaning, if appropriate, according to ASTM D–2724. Materials that cannot be washed or dry-cleaned should be so labeled, and should meet the applicable performance criteria after being cleaned as recommended by the manufacturer.

5. ASTM E–662 maximum test limits for smoke emission (specific optical density) should be measured in either the flaming or non-flaming mode, depending on which mode generates more smoke.

6. Flooring and Fire Wall assemblies should meet the performance criteria during a nominal test period determined by the transit property. The nominal test period should be twice the maximum expected period of time, under normal circumstances, for a vehicle to come to a complete, safe stop from maximum speed, plus the time necessary to evacuate all passengers from a vehicle to a safe area. The nominal test period should not be less than 15 minutes. Only one specimen need be tested. A proportional reduction may be made in dimensions of the specimen provided that it represents a true test of its ability to perform as a barrier against vehicle fires. Penetrations (ducts, piping, etc.) should be designed against acting as conduits for fire and smoke.

7. Carpeting should be tested in according with ASTM E–648 with its padding, if the padding is used in actual installation.

8. Arm rests, if foamed plastic, are tested as cushions.

9. Testing is performed without upholstery.

Definition of Terms

1. Flame spread index (I$_5$) as defined in ASTM E–162 is a factor derived from the rate of progress of the flame front (F) and the rate of heat liberation by the material under test (Q), such that $I_5=F_5\times Q$.

2. Specific optical density (D$_5$) is the optical density measured over unit path length within a chamber of unit volume produced from a specimen of unit surface area, that is irradiated by a heat flux of 2.5 watts/cm^2 for a specified period of time.

3. Surface flammability denotes the rate at which flames will travel along surfaces.

4. Flaming running denotes continuous flaming material leaving the site of the during material at its installed location.

5. Flaming dripping denotes periodic dripping of flaming material from the site of burning material at its installed location.

Referenced Fire Standards

The source of test procedures listed in Table 1 is as follows:

(1) Leaching Resistance of Cloth, FED–STD–191A–Textile Test Method 5830.

Availability from: General Services Administration Specifications Division, Building 197, Washington, Navy Yard, Washington, DC 20407.

(2) Federal Aviation Administration Vertical Burn Test, FAR–25–853.

Available from: Superintendent of Documents, US Government Printing Office, Washington, DC 20402.

(3) American Society for Testing Materials (ASTM)

(a) Surface Flammability of Materials Using a Radiant Heat Energy Source, ASTM E–162;

(b) Surface Flammability for Flexible Cellular Materials Using a Radiant Heat Energy Source, ASTM D–3675;

(c) Fire Tests of Building Construction and Materials, ASTM E–119;

(d) Specific Optical Density of Smoke Generated by Solid Materials, ASTM E–662;

(e) Bonded and Laminated Apparel Fabrics, ASTM D–2724;

(f) Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams, ASTM D–3574.

Available from: American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

In all instances, the most recent issue of the document or the revision in effect at the time of request should be employed in the evaluation of the material specified herein.

Issued: October 14, 1993.

Grace Crunican,

Deputy Administrator.

[FR Doc. 93–25709 Filed 10–19–93; 8:45 am]

BILLING CODE 4910–57–P

IX. TABLE 1

TABLE 1: RECOMMENDATIONS FOR TESTING THE FLAMMABILITY AND SMOKE EMISSION CHARACTERISTICS OF TRANSIT BUS AND VAN MATERIALS

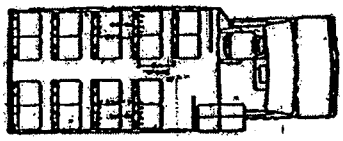
Category	Function of Material	Test Procedure	Performance Criteria
Seating	Cushion[1;2;3;5;9*]	ASTM D-3675	$I_s \leq 25$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
	Frame[1;5;8]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
	Shroud[1;5]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
	Upholstery[1;3;4;5]	FAR 25.853 (Vertical)	Flame time ≤ 10 seconds; burn length ≤ 6 inches
		ASTM E-662	$D_s(4.0) \leq 250$ coated; $D_s(4.0) \leq 100$ uncoated
Panels	Wall[1;5]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
	Ceiling[1;5]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
	Partition[1;5]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
	Windscreen[1;5]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
	HVAC Ducting[1;5]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(4.0) \leq 100$
	Light Diffuser[5]	ASTM E-162	$I_s \leq 100$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$
Flooring	Wheel Well and Structural[6]	ASTM E-119	Pass
	Carpeting[7]	ASTM E-648	C.R.F. ≥ 0.5 w/cm^2
Insulation	Thermal[1;3;5]	ASTM E-162	$I_s \leq 25$
		ASTM E-662	$D_s(4.0) \leq 100$
	Acoustic[1;3;5]	ASTM E-162	$I_s \leq 25$
		ASTM E-662	$D_s(4.0) \leq 100$
Miscellaneous	Firewall[6]	ASTM E-119	Pass
	Exterior Shell[1;5]	ASTM E-162	$I_s \leq 35$
		ASTM E-662	$D_s(1.5) \leq 100; D_s(4.0) \leq 200$

* Refers to Notes on Table 1

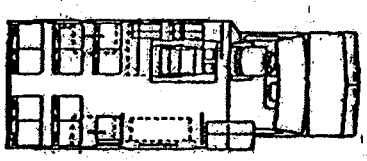
X. BUS SEATING ARRANGEMENTS

The 18-passenger non-lift bus and lift bus shall be supplied as requested in the following seating arrangements:

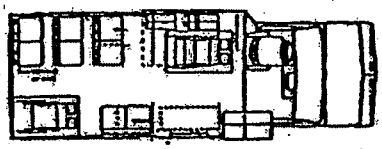
Small Bus Floor Plans



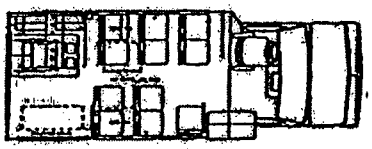
A. 18 Passenger w/o Lift



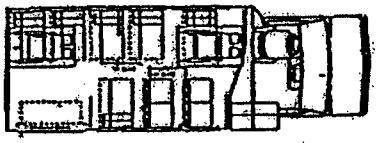
B. 11+1 Passenger with lift forward of rear axle



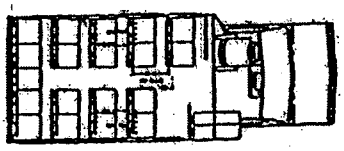
C. 8+2 Passenger with lift forward of rear axle



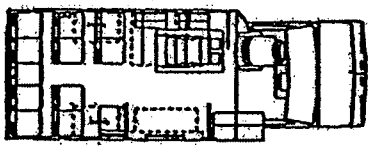
D. 11+1 Passenger with platform lift behind rear axle



E. 4+2 Passenger with platform lift behind rear axle



F. 19 Passenger w/o lift with five place rear seat, option with rear exit window option



G. 12+1 Passenger with lift forward of rear axle with five place rear seat option with rear exit window option

This specification was developed as a cooperative effort between the Michigan Department of Transportation and a committee of representatives from various Michigan Public Transit Agencies.

Upon request, this specification can be obtained in alternative format such as braille, large print, or audio tape. Contact Al Johnson, Michigan Department of Transportation, at 517/335-2549

4.303 Staffing

Hoekstra Transportation, Inc employs nearly 35 people for *just* the bus side of our business, this number has grown a lot over the last five years and we expect to continue growing in the future. The last five years have been a challenge as we added staff to keep up with the number of units we are selling and the number of units in service in Michigan. Having the proper staffing levels is a difficult issue and we have learned only through the experience of administering a number of large contracts – experience is the best guide for staffing level.

Jeff Kreiser – Commercial Products Manager/Contract Administrator, over see all areas of any contracts in place with MDOT or with any agencies in the State of Michigan, such as SMART, Manistee, Etc. 3741 Roger B Chaffee Blvd, Grand Rapids, MI 616-245-7440

John Hoekstra – President, involved directly and daily in all aspects of the bus side of our business. Will take phone calls and involve himself to resolve customer concerns at any level. Main office is at 260 36th Street, SE Grand Rapids, Michigan Ph. 616-241-6664

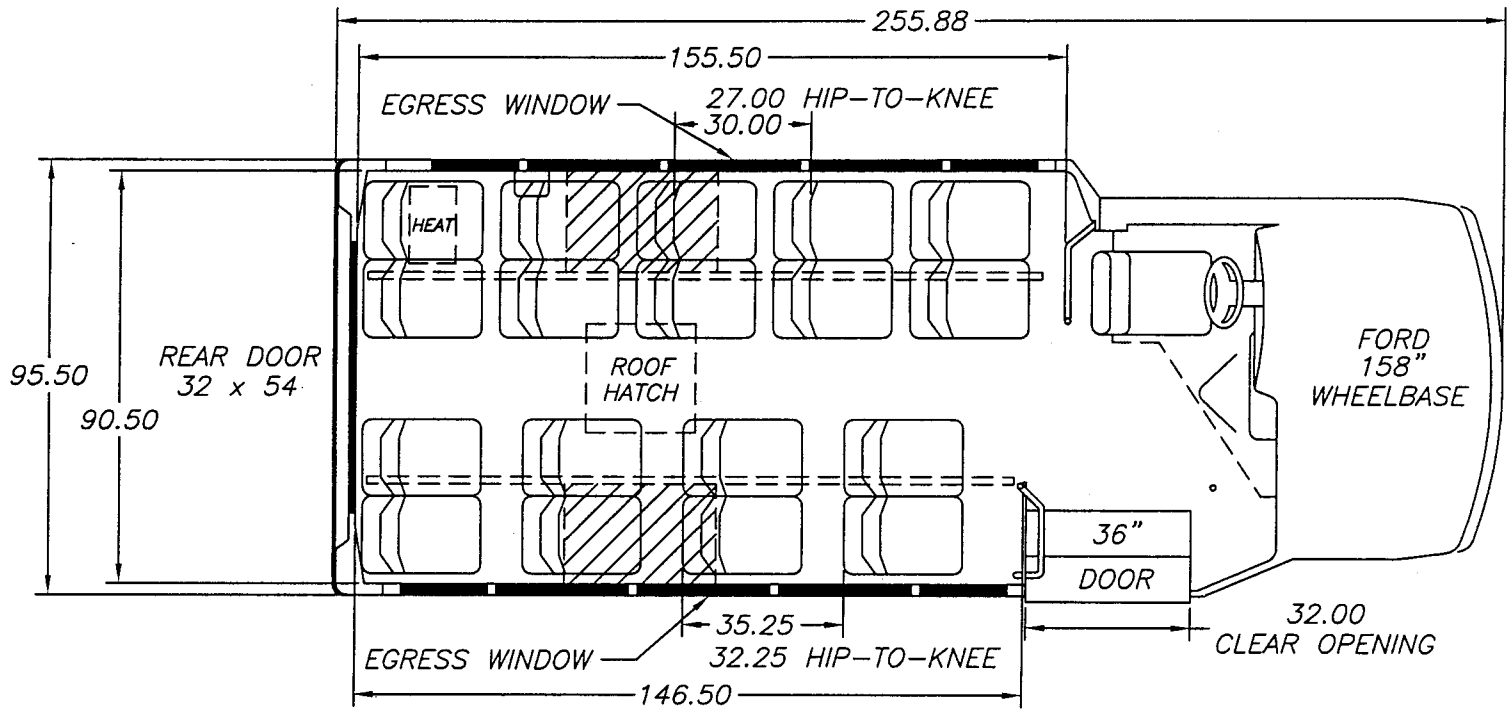
Tom Hoekstra – Vice President, also available to assist in any manor necessary, very familiar with MDOT contracts and contacts and equally as involved with ElDorado National. 3741 Roger B Chaffee Blvd, Grand Rapids, MI 616-245-7440

Sunshine Emus/Ken Haverkate – Warranty Administrator – see warranty/service section.

Ken Haverkate – Service Manager – see warranty/service section

Kevin Guidet – Technical Assistance

ElDorado National as the manufacturer will be the only sub-contractor – they will coordinate the chassis, and all other components for this contract – please review the company information from ElDorado National.



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THIS DRAWING IS THE PROPERTY OF ELDORADO NATIONAL COMPANY, A THOR INDUSTRIES COMPANY AND IS NOT TO BE DUPLICATED OR USED IN ANY WAY DETRIMENTAL TO THEIR BEST INTEREST. REV. 02/02	TOLERANCE UNLESS SPECIFIED						
	FRACTIONS ± 1/16	-	BJM	6/17/04	RELEASE TO PRODUCTION		
	DECIMALS .00 ± .06						
	ANGLES + 1 DEG.	REV.	BY	DATE	DESCRIPTION	RELEASE #	

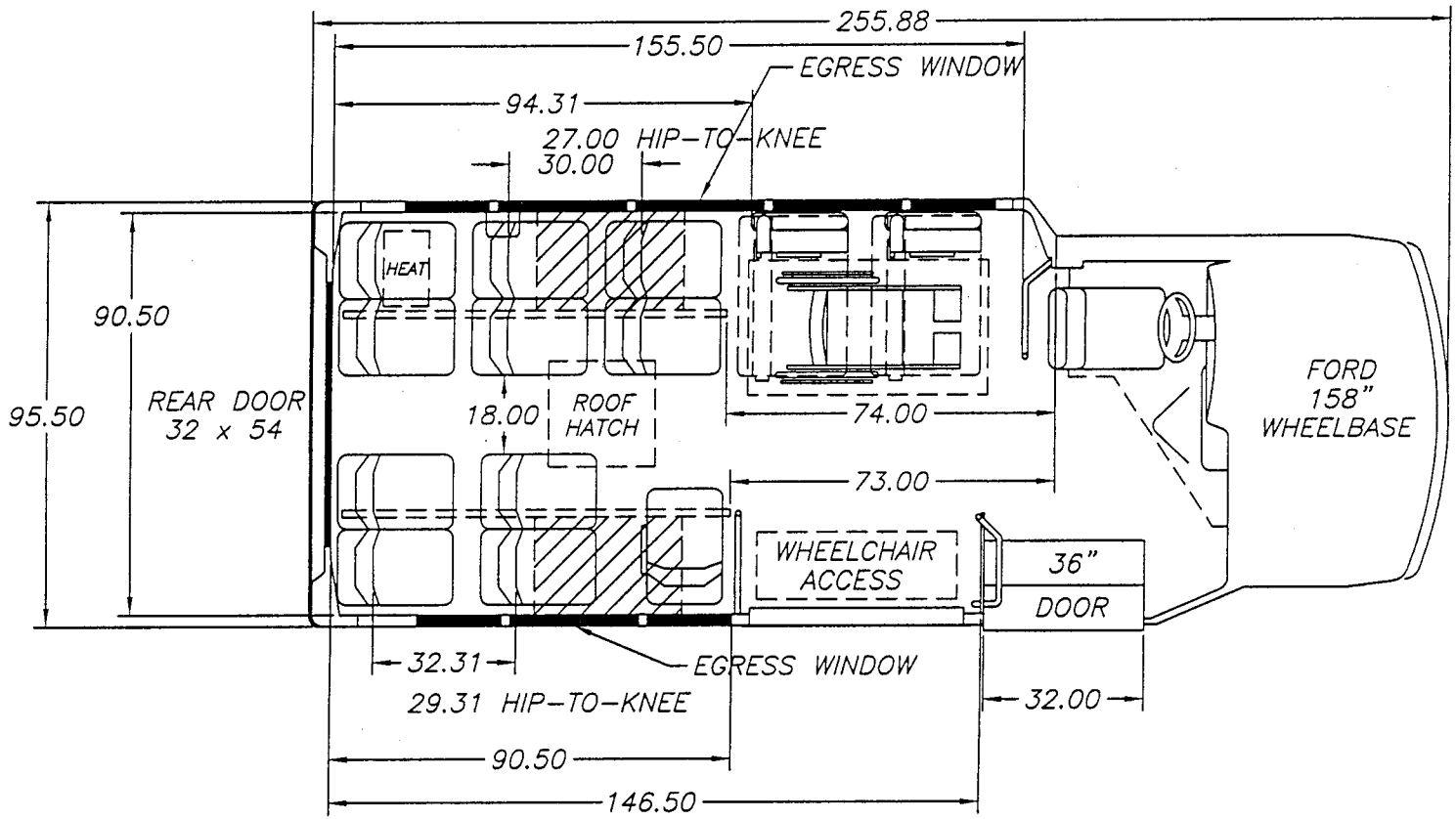
ElDorado National
— a THOR company —
1655 WALL STREET
SALINA, KS. 67401

TITLE:
AEROTECH 200
36" ENTRY DOOR

MATERIAL SPEC:

PART NUMBER
AT2002-JM08 A48

PAGE
1 OF 1



NOTE: W/C PLACEMENT IS 54" X 30"

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	FRACTIONS ± 1/16 DECIMALS .00 ± .06 ANGLES + 1 DEG.	–	BJM	6/17/04	RELEASE TO PRODUCTION		
		REV.	BY	DATE	DESCRIPTION	RELEASE #	

ElDorado National — a THOR company —
1655 WALL STREET
SALINA, KS. 67401

TITLE:
AEROTECH 200
36" ENTRY DOOR / WC DOOR (FRONT)

MATERIAL SPEC:

PART NUMBER
AT2008-JM05 B48

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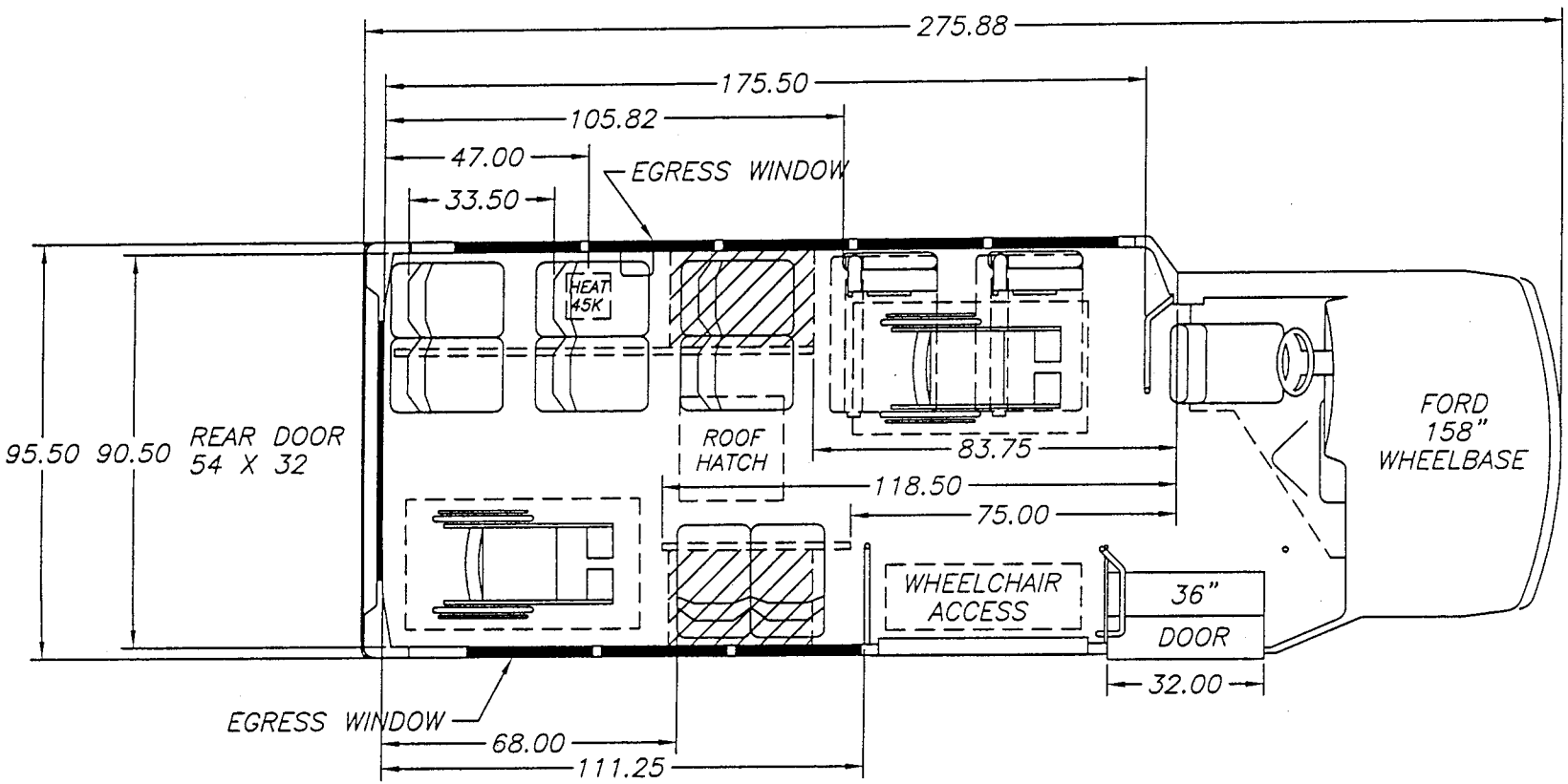
1 OF 1



NOTE: W/C PLACEMENTS ARE
54 X 30

NEXT ASSEMBLY: NONE	DRAWING INFORMATION						
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	FRACTIONS ± 1/16	-	BJM	6/17/04	RELEASE TO PRODUCTION		
	DECIMALS .00 ± .06						
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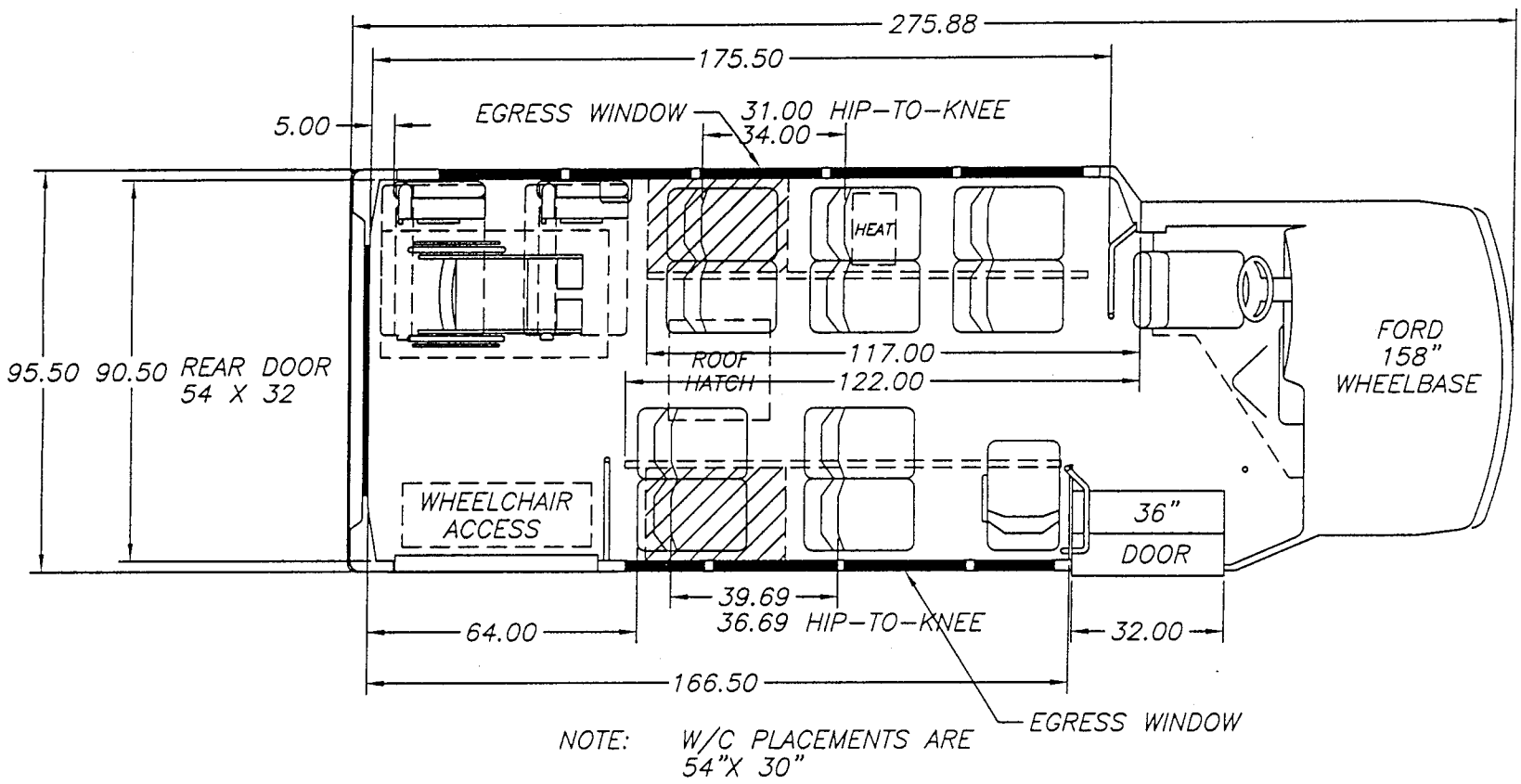
ElDorado National
— a THOR company —
1655 WALL STREET
SALINA, KS. 67401

TITLE:
AEROTECH 220
36" ENTRY DOOR / WC DOOR (FRONT)

MATERIAL SPEC:

PART NUMBER
AT2208-JM04 C48

PAGE
1 OF 1



NOTE: W/C PLACEMENTS ARE 54"X 30"

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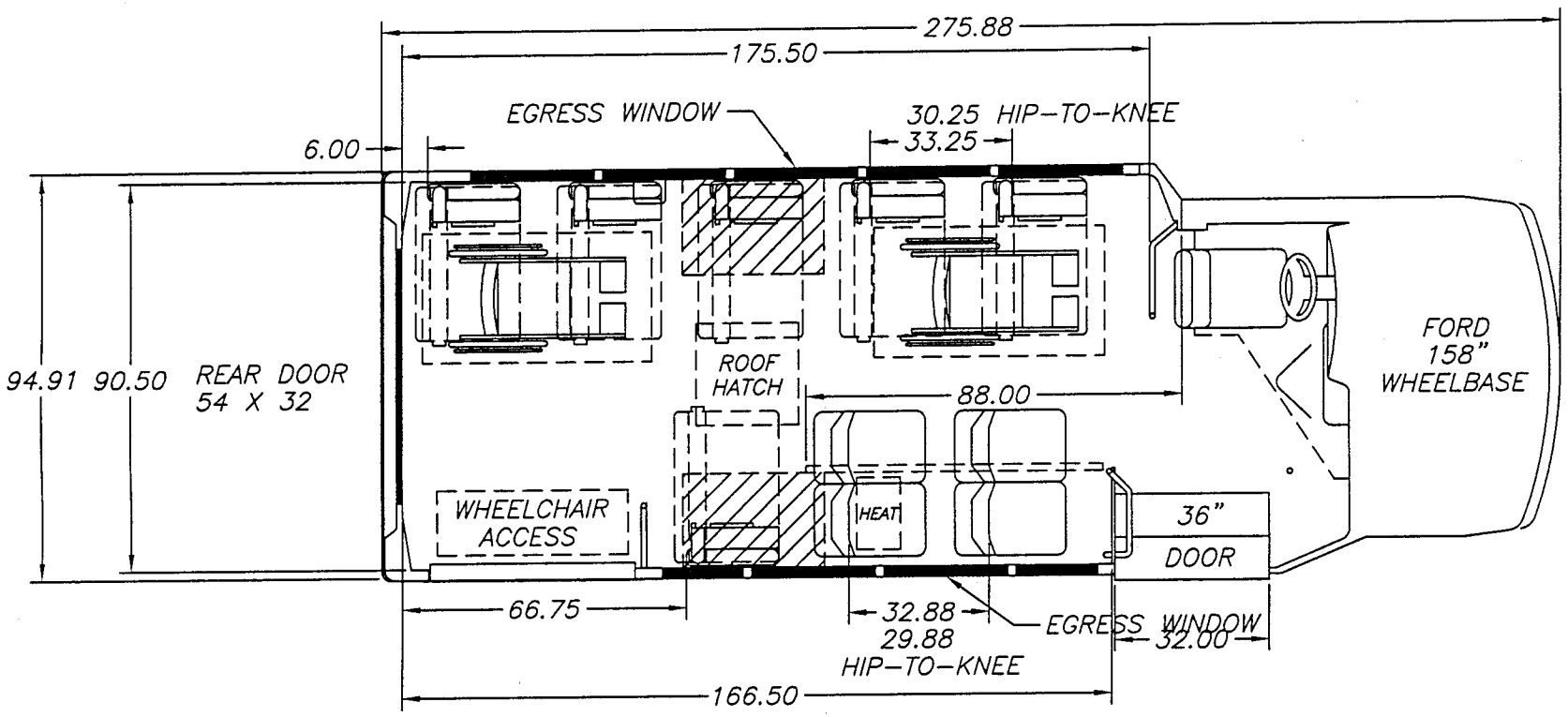

NOTE: W/C PLACEMENTS ARE
54" X 30"

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			REV.	BY	DATE	DESCRIPTION	RELEASE #

ElDorado National
— a THOR company —
1655 WALL STREET
SALINA, KS. 67401

TITLE:
AEROTECH 220
36" ENTRY DOOR / WC DOOR (REAR)

MATERIAL SPEC:

PART NUMBER
AT2211–JM08 E48

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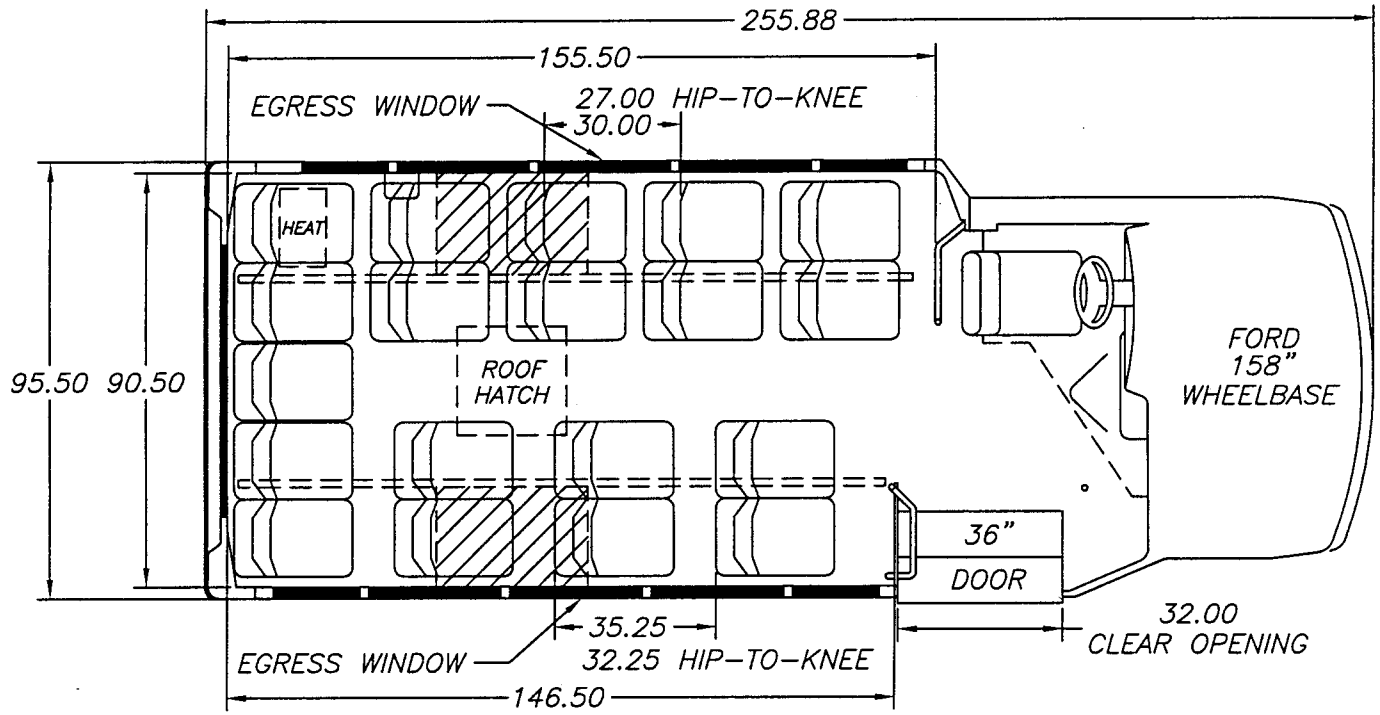
1 OF 1



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	DECIMALS .00 ± .06						
	ANGLES + 1 DEG.	REV.	BY	DATE	DESCRIPTION	RELEASE #	

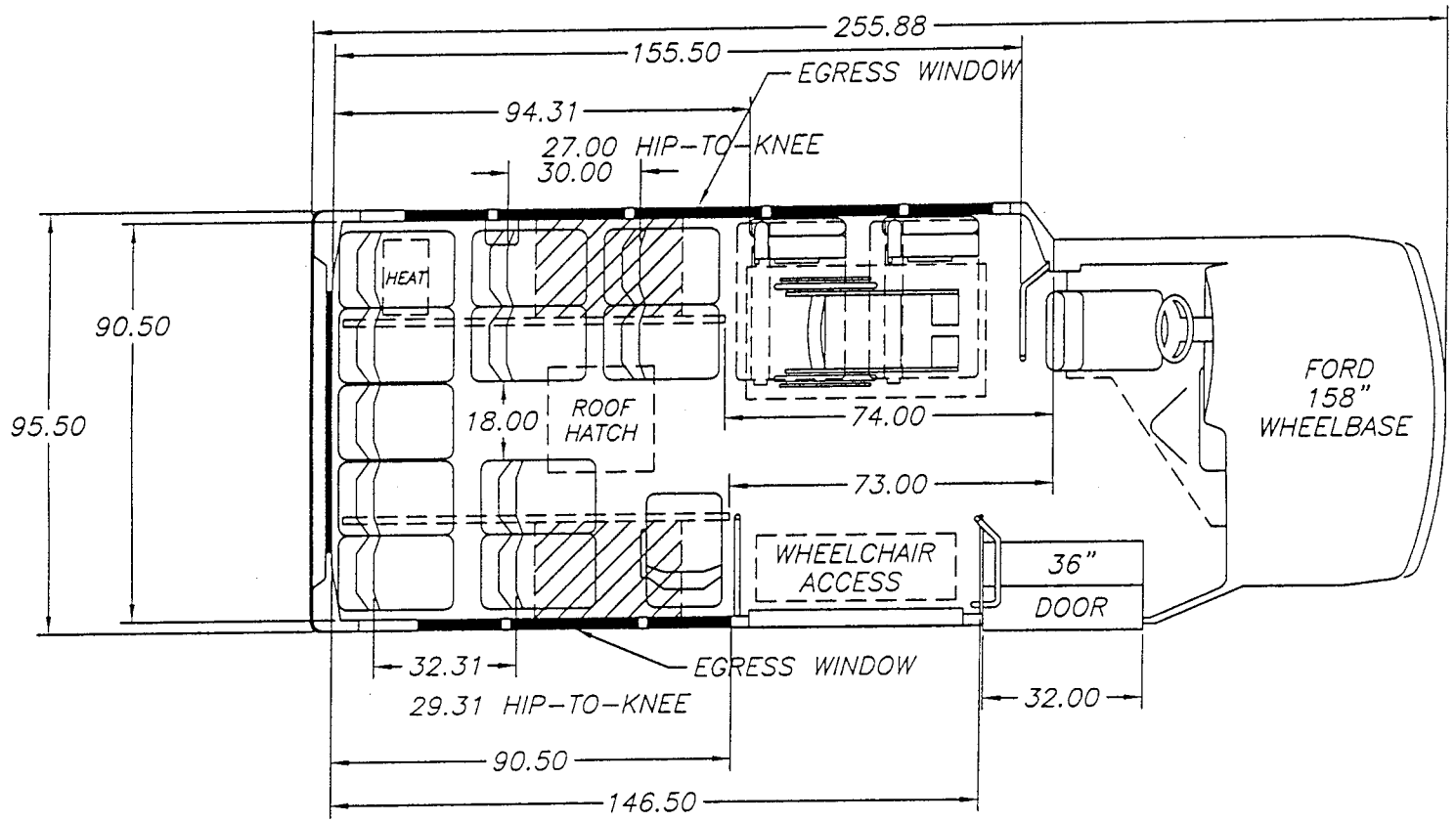
ElDorado National
— a THOR company —
1655 WALL STREET
SALINA, KS. 67401

TITLE:
AEROTECH 200
36" ENTRY DOOR

MATERIAL SPEC:

PART NUMBER
AT2002-JM07 F48

PAGE
1 OF 1



NOTE: W/C PLACEMENT IS 54" X 30"

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	DECIMALS .00 ± .06		REV.	BY	DATE	DESCRIPTION	RELEASE #
	ANGLES + 1 DEG.						

ElDorado National — a THOR company —
1655 WALL STREET
SALINA, KS. 67401

TITLE:
AEROTECH 200
36" ENTRY DOOR / WC DOOR (FRONT)

MATERIAL SPEC:

PART NUMBER AT2008-JM06 G48

PAGE 1 OF 1

2004 E-SERIES VAN / CUTAWAY / CHASSIS CAB / STRIPPED CHASSIS

INDEX

PAYLOAD CAPACITY AND STANDARD EQUIPMENT SPECIFICATIONS

E-450 Super Duty Cutaway / Chassis Cab

REAR WHEELS:			DRW	DRW	DRW	DRW
WHEELBASE:			158"	176"	158"	176"
PAYLOAD PACKAGE:			#1	#1	#1 - OPT. (NGV)	#1 - OPT. (NGV)
MAXIMUM PAYLOAD RATING:[1] (lb)			8435 / 8360[2]	8410 / 8335[2]	8420 / 8345[2]	8320
GVWR: (lb)			14050	14050	14050	14050
GAWR:[3] (lbs						
Front	—	Min.	4600	4600	4600	4600
	—	Max.	4600	4600	4600	4600
Rear	—	Min.	9450	9450	9450	9450
	—	Max.	9450	9450	9450	9450
POWERTRAIN:						
Engine	—	Application	Refer To Preferred Equipment Packages For 50 States Usage			
	—	Type	6.8L SEFI V-10		5.4L NGV V-8	
Transmission	—	Type	4-Speed Auto OD (4R100)			
AXLES:						
Front Axle	—	Type	Twin I-Beam IFS			
	—	Capacity (Rating @ Ground)	4600 lb			
Rear Axle	—	Type	Full-Floating Dana 10.5" HD			
	—	Capacity (Rating @ Ground)	9450 lb			
BRAKES:						
Front Disc	—	Type	Dual Piston 2.20" Diameter Cylindrical, Pin Slider Caliper			
	—	Size	13.03" Diameter			
Rear Disc	—	Type	Self-Adjusting			
	—	Size	12.90" Diameter			
Power-Assist Unit	—	Type	Hydro-Boost, 1.56" Diameter			
Anti-Lock System			Four Wheel			
Parking Brake	—	Transmission Mounted Drum	Foot Operated, Push to Apply/Push & Release To Disengage			
ELECTRICAL:						
Alternator	—	Rating	3GLF - 130 Amperes, 1950 Watt			
Battery	—	Type	Maintenance-Free			
	—	Rating	72 Amp.-hr., 650 CCA			
Kit			Modified Vehicle Wiring			
FUEL TANK	—	Capacity[4]	55 gallon Aft-Of-Rear-Axle			
STEERING:	—	Type	Power, Ford XR-50 H.D. Gear			
	—	Ratio	17.0:1			
SUSPENSION:						
Frame	—	Type	Single Channel, 6 Crossmembers, 36,000 psi Steel			
	—	Section Modulus	6.40 cu. in.			
Springs, Front	—	Type	Coil			
	—	Rating @ Ground (min.)	4600 lb.			
Springs, Rear	—	Type	Multi-Leaf, Single-Stage			
	—	Rating @ Ground (min.)	9450 lb			
Shock Absorbers	—	Gas-Type	1.38"			
Stabilizer Bar	—	Front—Diameter	1.00"			
Stabilizer Bar	—	Rear—Diameter	1.125"			
TIRES:	—	Type	Six BSW, Truck-Type Steel-Belted Radial, All-Season			
	—	Size	LT225/75Rx16E			
WHEELS:	—	Type & Size	Six, 8-Hole Disc, 16" x 6.0" K Steel			

NOTE: Refer to the end of this section for Preferred Equipment Package content and option availability.

(1) Load rating represents maximum allowable weight of people, cargo and body equipment and is reduced by optional equipment weight.
(2) Chassis Cab
(3) Gross Axle Weight Rating is determined by the rated capacity of the minimum component of the axle system (axle, computer-selected springs, wheels and tires) of a specific vehicle. Front and rear GAWR's will, in all cases, sum to a number equal to or greater than the GVWR for the particular vehicle. Maximum loaded vehicle (including passengers, equipment and payload) cannot exceed the GVW rating or GAWR (front or rear).
(4) Also includes 7.5 gallons plastic transit fuel tank (may be deleted), Auxiliary Fuel Port and Fuel System Conversion Kit.

STANDARD EQUIPMENT SPECIFICATIONS

Standard Equipment Specifications With 6.0L V-8 Turbo Diesel Engine

When equipped with optional 6.0L (363) V-8 DI Turbo Diesel engine, all models include the following equipment in addition to, or in place of, standard equipment:

- Batteries, dual 78 amp.-hr./750 CCA
- Fuel line filter, heater and water separator
- Oil cooler, integral engine
- Pump, vacuum
- Sound reduction package
- "Wait-To-Start", "Water-In-Fuel", "Engine Temp." and "Fuel Filter" light cluster

E-350/450 Super Duty Commercial Stripped Chassis Dunnage Box Content

- Chassis nameplate
- Fuel fill instructions label
- Fuel fill pipe and cap
- Fuel fill pipe housing and attaching screws
- Fuel fill hose and clamp
- Fuel vent hose and clamp
- Headlight and parking lights with on/off switch
- Incomplete Vehicle Manual
- Instrument Cluster
- Modified vehicle wiring kit
- Vehicle identification kit
- Warranty Facts Booklet

TECHNICAL SPECIFICATIONS

Axles

FRONT AXLE SPECIFICATIONS

Model/Series		E-150	E-250/350 SD/450 SD
Max. Rating @ Ground (lb)		3600	4600
Type		Twin-I-Beam Spindle with Ball Joints	
Axle	— Material	Nodular Cast Iron	
	— Spring Centers (in.)	46.7	47.0
Radius Arms	— No.	2	2
	— Material	High-Strength Low-Alloy Steel	
Ball Joint	—	Lubed for Life Ball Joints	
Spindle	— Material	Nodular Cast Iron Body with Forged Steel Stem	
Wheel Bearings	— Type	Tapered Roller	

REAR AXLE SPECIFICATIONS

Model/Series		E-150	E-250	E-350 SD	E-350 SD Extended	E-450 SD
Make		Ford 8.8"	Dana 9.75"	Dana 9.75" HD	Dana 10.5"	Dana 10.75 HD
Rating @ Ground (lb)		3800	5520	6340	7800	9450
Type		Semi-Floating			Full-Floating	
Driveline Attachment		4.25" Circular Flange				4.75" Circular Flange
Housing	— Type	Cast center				
	— Cover Attachment	Bolted				
Section	— Tube Diameter (in.)	3.26	3.50	3.50	3.50	4.00
	— Thickness (in.)	0.18	0.33	0.33	0.39	0.625
Lubricant Capacity (pt.)		5.5	6.25	6.25	6.6	8.25
Spring centers (in.)		48.92				
Wheel Bearings	— Type	Straight Roller			Tapered Roller, 2 opposed	
Gears	— Type	Hypoid				
	— Material	Alloy Steel				
Ring Gear	— Pitch Diameter (in.)	8.80 / 9.75	9.75	9.75	10.50	10.75
	— Mounting	Overhung				
Differential	— Type	2-Pinion			2-Pinion(1)	
	— L/S Type	Traction-Lok			Power-Lok	Traction-Lok
Axle Shaft	— Spline Minor Dia. (in.)	1.29	1.36	1.36	1.268	1.268
	— Spline - Major Dia. (in.)	1.32	1.45	1.45	1.375	1.375
	— Number Of Splines	31	35	35	32	35

(1) 4-pinion for Limited Slip.

Brakes

HYDRAULIC BRAKE EQUIPMENT SPECIFICATIONS — FRONT/REAR

Type	Model/Series	Rotor Dia (in.) OD	Rotor Dia (in.) ID	Brake Lining Segment	Area $(in.)^2$/ Width (in.)/ Thickness(in.)	Caliper Piston Dia (in.)	Gross Lining Area Per Axle $(in.)^2$	Total Swept Area Per Axle $(in.)^2$
Disc	E-150	11.72	7.56	Outboard	9.15/1.95/0.383	2.87	36.60	220.76
				Inboard				
	E-250/350 SD/450 SD	13.03	9.06	Outboard	12.40/1.79/0.478	2.20	49.60	270.40
				Inboard				
	E-450 SD	12.90	8.07	Outboard	16.40/2.28/0.541	2.36	65.40	299.00
				Inboard				

TECHNICAL SPECIFICATIONS

BRAKE MASTER CYLINDER SPECIFICATIONS

Type	Model/Series	Bore Diameter (in.)
Dual System, Dash-Mounted	E-150	1.062
	E-250/350 SD	1.125
	E-450 SD	1.312

POWER BRAKES VACUUM BOOSTER SPECIFICATIONS

Type	Model/Series	Effective Diameter (in.)	Outside Diameter (in.)	Diaphragm Type
Bendix, Dash-Mounted	E-150/250/350 SD	13.46	10.92	Dual

POWER BRAKES HYDRAULIC BOOSTER SPECIFICATIONS

Type	Model/Series	Effective Diameter (in.)
Hydro-Boost	E-450 SD	1.56

Cooling Systems

COOLING SYSTEM SPECIFICATION

				Core Size (in.)					Cooling System	Fan Specifications		
Engine	Cooling	Trans. Usage	Frontal Area $(in.)^2$	Height	Width	Thick.	Rows of Tubes	Fins Per Inch	Capacity (approx. quarts)	Type	No. of Blades	Blade Dia. (in.)
4.6L SEFI V-8	All	Auto.	712	23.6	30.2	1.0	1	15.2	25.0	Plastic	10	19.4
5.4L SEFI V-8	All	Auto.	712	23.6	30.2	1	1	21.6	27.8	Plastic	10	19.4
6.8L SEFI V-10	All	Auto.	712	23.6	30.2	1	1	21.6	29.4	Plastic	8	20.0
6.0L V-8 Diesel	All	Auto.	712	23.6	30.2	1	1	21.6	21.8	Plastic	9	23.0

AUXILIARY AUTOMATIC TRANSMISSION OIL COOLER APPLICATIONS

Model/Series	Engine	Transmission	Standard No. of plates	Air Conditioning No. of Plates	Trailer Towing No. of Plates
E-150/250	4.6L SEFI V-8	4R70W	20 - 5/16" tubes	20 - 5/16" tubes	20 - 5/16" tubes
	5.4L SEFI V-8	4R70W	26 - 3/8" tubes	26 - 3/8" tubes	26 - 3/8" tubes
E-250/350/450 SD(1)	5.4L SEFI V-8	4R100	20 - 3/8" tubes	20 - 3/8" tubes	24 - 3/8" tubes
	6.8L SEFI V-10	4R100	20 - 3/8" tubes	20 - 3/8" tubes	24 - 3/8" tubes
	6.0L V-8 Diesel	4R100	20 - 3/8" tubes	20 - 3/8" tubes	26 - 3/8" tubes

(1) E-250 over 8500-lbs. GVWR.

TECHNICAL SPECIFICATIONS

FUEL SYSTEM DATA

Electronic Fuel Injection	4.6L SEFI V-8	Sequential Multiport Fuel Injection
	5.4L SEFI V-8	Sequential Multiport Fuel Injection
	6.8L SEFI V-10	Sequential Multiport Fuel Injection
	6.0L V-8 Diesel	Hydraulic Electronic Unit Injection
Fuel Pump	All Gasoline Engines	Electric-In-Tank High Pressure
Fuel Filter	All Gasoline Engines	In-Line Large Capacity (One)
	6.0L V-8 Diesel	Full-Flow, Disposable Plus In-Line Water Separator
Air Cleaner	All Engines	Dry Element, Replaceable

Steering

STEERING SPECIFICATIONS

		Power Steering[1]		Turning Diameter (ft.)[2]	
Model/Series	**Wheelbase (in.)**	**Gear Ratio**	**Overall Ratio**	**Curb-to-Curb**	**Wall-to-Wall**
E-150	138	17:1	15.9:1	46.7	48.9
E-250	138	17:1	21.2:1	48.0	50.2
E-350 SD SRW	138	17:1	21.2:1	48.0	50.2/50.6[3]
E-350 SD DRW	138	17:1	21.2:1	47.9	50.2/50.6[3]
E-350 SD SRW	158	17:1	21.2:1	54.0	56.6[3]
E-350 SD DRW/ E-450 SD	158	17:1	21.2:1	54.1	56.7[3]
	176	17:1	21.2:1	59.9	62.5[3]

(1) 15-1/2" diameter steering wheel. E-350 SD Van with 6.0L V-8 Diesel and 6.8L SEFI V-10 and Cutaway and Stripped Chassis models include HD Steering gear.
(2) Average of left and right turns with standard tires.
(3) Commercial Stripped Chassis.

Suspension

FRAME SPECIFICATIONS

Model/Series	**Wheelbase (in.)**	**Maximum Side Rail Section (in.)**	**Section Modulus $(in.)^3$**	**Yield Strength (psi)**
E-150	138	6.05 x 3.18 x 0.161	2.92	36,000
E-250	138	6.16 x 3.18 x 0.181	3.30	36,000
E-350 SD Van	138	7.69 x 3.18 x 0.212	5.44	36,000
E-350/450 SD Cutaway/Chassis Cab/ Stripped Chassis	138, 158, 176	7.69 x 3.18 x 0.228	5.73	36,000
E-450 SD Cutaway/Chassis Cab	158, 176	7.69 x 3.18 x 0.248	6.40	36,000

SHOCK ABSORBER SPECIFICATIONS

		Front & Rear		
Model/Series	**Usage**	**Number**	**Piston Diameter (in.)**	**Type**
E-150	Standard	4	1.00	Gas pressurized
	HD RPO[1]	4	1.19	Gas pressurized
E-250	Standard	4	1.19	Gas pressurized
	HD RPO[1]	4	1.38	Gas pressurized
E-350SD/E-450 SD	Standard	4	1.38	Gas pressurized

(1) Included with Handling Package and Trailer Towing Package.

TECHNICAL SPECIFICATIONS

Suspension (Cont'd)

SPRING SPECIFICATIONS — FRONT COIL

Model/Series	GVWR (lb)	Combined Rating @ Ground (lb)	Normal Working Height of Spring (in.)	Wire Diameter (in.)	Deflection Rate @ Ground (lb per in. each)	Inside Diameter (in.)	Rating Each @ Pad (lb per spring)
E-150 Van	6700	3240	11.60	0.706	253	4.0	1829
		3400	11.60	0.717	264	4.0	1934
		3600	11.60	0.726	279	4.0	2058
	6700 Crew	3240	11.60	0.706	253	4.0	1829
		3400	11.60	0.717	264	4.0	1934
		3600	11.60	0.726	279	4.0	2058
	7000 RV	3240	11.60	0.706	253	4.0	1829
		3400	11.60	0.717	264	4.0	1934
		3600	11.60	0.726	279	4.0	2058
E-250 Van	7200	3400	12.0	0.736	293	4.0	1924
		3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
	8600	3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
	8600 Crew	3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
	8600 NGV	3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
E-250 Extended Van	7300	3100	12.0	0.695	239	4.0	1732
		3250	12.0	0.704	251	4.0	1828
		3400	12.0	0.736	293	4.0	1924
	8600	3250	12.0	0.704	251	4.0	1828
		3400	12.0	0.736	293	4.0	1924
		3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
	8600 Crew	3250	12.0	0.704	251	4.0	1828
		3400	12.0	0.736	293	4.0	1924
		3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229

TECHNICAL SPECIFICATIONS

Suspension (Cont'd)

SPRING SPECIFICATIONS — FRONT COIL

Model/Series	GVWR (lb)	Combined Rating @ Ground (lb)	Normal Working Height of Spring (in.)	Wire Diameter (in.)	Deflection Rate @ Ground (lb per in. each)	Inside Diameter (in.)	Rating Each @ Pad (lb per spring)
E-350 Super Duty Van	9500	3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670
	9500 Crew	3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670
	9500 NGV	3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
E-350 Super Duty Extended Van	9250 Crew (Gas)	3400	12.0	0.736	293	4.0	1924
	9400	3400	12.0	0.736	293	4.0	1924
		3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670
	9400 Crew (Diesel)	3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670
	9300 NGV	3400	12.0	0.736	293	4.0	1924
		3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101

TECHNICAL SPECIFICATIONS

Suspension (Cont'd)

SPRING SPECIFICATIONS — FRONT COIL

Model/Series	GVWR (lb)	Combined Rating @ Ground (lb)	Normal Working Height of Spring (in.)	Wire Diameter (in.)	Deflection Rate @ Ground (lb per in. each)	Inside Diameter (in.)	Rating Each @ Pad (lb per spring)
E-350 Super Duty Cutaway	9600 SRW (138")	3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670
	10700 (138")	3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670
	11500 (158"/176")	4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670
	11500 (138")[1]	4050	12.0	0.780	353	4.0	2318
E-350 Super Duty Chassis Cab	10700 (138")	3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	343	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
	11500 (158"/176")	4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
		4600	12.0	0.802	377	4.0	2670

TECHNICAL SPECIFICATIONS

Suspension (Cont'd)

SPRING SPECIFICATIONS — FRONT COIL

Model/Series	GVWR (lb)	Combined Rating @ Ground (lb)	Normal Working Height of Spring (in.)	Wire Diameter (in.)	Deflection Rate @ Ground (lb per in. each)	Inside Diameter (in.)	Rating Each @ Pad (lb per spring)
E-350 Super Duty Commercial Stripped Chassis	9600 (138″)	3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	346	4.0	2229
	9600 (158″)	3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	346	4.0	2229
	10000 (138″)	3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	346	4.0	2229
	10000 (158″)	3550	12.0	0.744	305	4.0	2020
		3700	12.0	0.754	319	4.0	2101
		3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	346	4.0	2229
	10000 (176″)	3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	346	4.0	2229
		4050	12.0	0.780	353	4.0	2318
	11000 (158")	3800	12.0	0.762	332	4.0	2165
		3900	12.0	0.771	346	4.0	2229
		4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
	11000 (176")	4050	12.0	0.780	353	4.0	2318
		4200	12.0	0.788	362	4.0	2414
		4400	12.0	0.795	370	4.0	2542
E-450 Super Duty Cutaway/ Chassis Cab	14050	4600	12.0	0.802	377	4.0	2670
E-450 Super Duty Commercial Stripped Chassis	14050	4600	12.0	0.802	377	4.0	2670

(1) School Bus

TECHNICAL SPECIFICATIONS

Suspension (Cont'd)

SPRING SPECIFICATIONS — REAR MAIN LEAF

Model/Series	Combined Rating @ Ground (lb)	Number of Leaves	Total Thickness @ Pad (in.)	Length (in.)	Width (in.)	Deflection Rear (lb per in./spring)[1]	Rating Each @ Pad (lb per spring)
E-150 Van	3830	3	1.81	55.0	2.50	207/375	1685
E-250 Van	4265	4	1.77	55.0	3.00	275/500	1825
	5345	4	1.94	55.0	3.00	325/650	2350
	5545	4	1.94	55.0	3.00	275/450	2350
E-250 Extended Van[2]	4265	4	1.77	55.0	3.00	275/500	1825
	5545	4	1.94	55.0	3.00	275/450	2350
E-350 Super Duty Van/ Extended Van	6195	4	2.31	55.0	3.00	377/702	2775
E-350 Super Duty Cutaway/ Chassis Cab	7810	9	3.60	55.0	3.00	894	3450
E-350 Super Duty Commercial Stripped Chassis	7810	9	3.60	55.0	3.00	894	3450
E-450 Super Duty Cutaway/ Chassis Cab/Commercial Stripped Chassis	9450	11	3.60	55.0	3.00	894	4370

(1) Dual numbers indicate two-stage spring.
(2) E-250 over 8500-lbs. GVWR.

Tires and Wheels

TIRE SPECIFICATIONS

Type / Size	Rim Width (in.)	Section Width (in.)	Ply Rating	Load Rating	Maximum Inflation Pressure (psi)	Load Limits @ Maximum Inflation Pressure (lb)	Static Loaded Radius (in.)	Revolutions Per Mile @ 45 mph
P235/70Rx16	7.0	9.40	—	XL	41	1984	13.10	719
LT225/75Rx16	6.0/7.0	9.50	8	E	60	2335	13.95	708
		9.60	10	E	80	2680	14.60	709
LT245/75Rx16	7.0	10.20	10	E	80	3042	14.10	677

WHEEL SPECIFICATIONS

Wheel Type	Wheel Size	Nominal Offset (mm.)	No. of Studs	Bolt Circle (in.)	Max Wheel Capacity Load (lb @ ground)
Steel	16" x 7.0" K	0.25	8	6.5	2300 Front/ 3045 Rear
	16" x 6.0" K (Dual)	5.15	8	6.5	2300 Front 2365 Rear
Aluminum	16" x 7.0" J	0.25	8	6.5	3045

TECHNICAL SPECIFICATIONS

Transmissions

AUTOMATIC TRANSMISSION SPECIFICATIONS

Make/Type	Ford 4-Speed Automatic Overdrive (4R70W)	Ford 4-Speed Automatic Overdrive (4R100)	Ford 5-Speed Auto. O/D (TorqShift™)
Ratios (to 1) —			
1st	2.84	2.71	3.09
2nd	1.55	1.54	2.20
3rd	1.00	1.00	1.54
4th — OD	0.70	0.71	1.00
5th — OD	—	—	0.71
Reverse	2.33	2.18	2.88
Converter	2.30	2.20 (5.4L Engine), 2.0 (6.8L / 6.0L Engine)	1.86
Lubricant Capacity (pt.)	24.0	32.0	32.0
Helical Gear	All	All	All
Oil Cooler	Water	Water	Water
Converter Size	12″ Controlled Clutch Apply	12″ Controlled Clutch Apply	12" Controlled Clutch Apply

PAYLOAD/WEIGHT RATINGS

Option/Payload Worksheet

Option Weight	(Front/ Total)(lb)
ENGINE/TRANSMISSION COMBINATIONS:	
4.6L (281) SEFI V-8 — w/4-Spd. Auto. OD (4R70W) (E-150)	(0/0)
5.4L (330) SEFI V-8 — w/4-Spd. Auto. OD (4R100) (E-150)	(45/88)
5.4L (330) SEFI V-8 — w/4-Spd. Auto. OD (4R70W) (E-250 Under 8500 lb GVWR)	(60/70)
5.4L (330) SEFI V-8 — w/4-Spd. Auto. OD (4R70W) (E-250 Over 8500 lb GVWR)	(49/57)
5.4L (330) SEFI V-8 — w/4-Spd. Auto. OD (4R100) (E-350 Super Duty)	(0/0)
5.4L (330) NGV V-8 — w/4-Spd. Auto. OD (4R100) (E-250 over 8500 lb.)	(108/127)
5.4L (330) NGV V-8 — w/4-Spd. Auto. OD (4R100) (E-350)	(48/70)
6.8L (415) SEFI V-10 — w/4-Spd. Auto. OD (4R100) (E-350 Super Duty)	(116/139)
6.0L (363) V-8 Turbo Diesel — w/5-Spd. Auto. OD (TorqShift™)	(608/666)
Limited Slip Rear Axle	(0/7)
TIRES (Add tire weight even if specified as standard equipment):	
P235/70Rx16XL (E-150)	(0/0)
LT225/75Rx16E	(0/0)
LT245/75Rx16E (E-350 Super Duty)	(0/0)
Interior Spare Tire Delete Kit	(1/-4)
TIRE EQUIPMENT:	
Spare Tire & Wheel Not Included	(11/-86)
PACKAGES:	
Ambulance Prep Package (E-350)	(2/2)
Auxiliary Heater & Air Conditioning	(-3/47)
Crew Van Package	(11/33)
Crew Van Interior Upgrade Package	(1/2)
Exterior Upgrade Package	(2/4)
Heater & A/C Prep Package	(18/21)
Heater & A/C Prep Package w/Rear Controls	(17/22)
Interior Upgrade Package	(8/11)
RV Plus Package	(1/1)
Seat Prep Package - Power	(3/5)
Trailer Towing (Class II/III/IV)	(-13/52)
Power Equipment Group	(9/13)
Radio Prep Package - 6 Speakers	(6/9)
OPTIONS:	
Air Bag, Passenger Delete (LPO)	(-9/-11)
Air Conditioning, High Capacity (Front/Rear)	(52/90)
A/C - Delete	(-51/-49)
Alternator, Dual	(21/20)
Battery, Heavy-Duty/Auxiliary	(29/67)
Bumpers, Chrome Front/Rear	(5/7)
Bumpers, Chrome Front/Rear Step	(-4/32)
Bumper, Painted Steel	(-8/28)
Captain's Chairs, Dual w/o Trim	(-23/-38)
Carpeting, Full Floor	(21/50)

Option Weight	(Front/ Total)(lb)
Console Delete, Floor (LPO)	(-9/-11)
Door, Hinged Cargo w/fixed glass	(-4/-10)
Door, Sliding Side Cargo w/o glass	(3/8)
Door, Sliding Side Cargo w/glass	(2/5)
Door Trim Panel - Delete	(-6/-8)
Deluxe Engine Cover Console - Delete	(-9/-11)
Floor Mat, Full-Length	(15/36)
Floor Mats, Throw-in	(5/6)
Front GAWR, One Up	(2/2)
Glass, Fixed Rear Cargo Door	(0/2)
Glass, Fixed Side/Fixed Rear Cargo Door	(2/14)
Glass, Swing-out Side/Fixed Rear Cargo Door (Hinged Side Doors)	(3/15)
Glass, Swing-out Side/Fixed Rear Cargo Door (Sliding Side Door)	(4/19)
Glass, Windows All-Around (Hinged Side Doors) (Regular Van)	(5/18)
Glass, Windows All-Around (Hinged Side Doors) (Extended Van)	(6/37)
Glass, Windows All-Around (Sliding Side Door) (Regular Van)	(7/23)
Glass, Windows All-Around (Sliding Side Door) (Extended Van)	(8/42)
Heater, Engine Block	(1/1)
Idle Control, Auxiliary	(4/4)
License Plate Bracket, Front	(1/1)
Mirror, Interior Day/Night	(1/1)
Mirrors, Base Exterior - Power	(1/1)
Mirrors, Exterior Delete	(-6/-9)
Mirrors, Trailer Tow - Power	(5/11)
Paint, Clearcoat	(2/3)
Radio, AM/FM Stereo/Cassette	(3/3)
Radio, Premium AM/FM Cassette/CD	(5/7)
Radio, Premium Plus CDX-6	(4/5)
Radio Delete	(-5/-13)
Running Boards	(22/45)
Seat, RH Delete	(-68/-85)
Seat, Power Driver's	(7/11)
Speed Control	(2/2)
Wheels, 16" Covers (E-150)	(5/11)
Wheels, 16"x 7" Bright Cast Aluminum (E-150)	(-18/-36)
Wheels, 16"x 7" Forged Aluminum (E-250/E-350)	(-32/-68)
Wheels, 16" Painted Aluminum	(-32/-68)
Wheel Trim Delete	(-1/-2)
Sub-Total: Front/Total	____/____
Plus Sub-Total: From 1st Column	____/____
(Line A) Total Actual Option Content Weight (Front/Total)	____/____

E-SERIES REGULAR AND EXTENDED VANS

PAYLOAD/WEIGHT RATINGS

Option/Payload Worksheet (Cont'd)

TABLE "A" — ALLOWABLE OPTION WEIGHT

Model/Series Number	Payload Package	GVWR (lb)	Regular Van[1] 138" WB. Max. Weights Front/Total (lb)	Extended Van[1] 138" WB. Max. Weights Front/Total (lb)
E-150 Van	1	6700	438/1541[2]	—
			462/1541[3]	—
	1	6700 (Crew)	157/864[2]	—
			155/849[3]	—
	2	7000 (RV)	372/1033[2]	—
			374/1068[3]	—
E-250 Van	1	7200	410/1729[2]	—
	1	7300	—	306/1696[2]
	1	8600	275/3109[2]	295/2904[2]
			379/3076[3]	447/2879[3]
	1	8600 (Crew)	210/2407[2]	211/2407[2]
			357/2371[3]	308/2392[3]
	1	8600 (NGV)	466/2579[3]	—
E-350 Super Duty Van	1	9250 (Crew)	—	243/2640[3]
			—	398/2640[4]
	1	9300 (NGV)	—	361/2818
	1	9400	—	375/3493[3]
			—	389/3493[4]
			—	968/3506[5]
	1	9400 (Crew)	—	993/2862[5]
	1	9500	427/3752[3]	—
			446/3742[4]	—
			913/3755[5]	—
	1	9500 (Crew)	316/3076[3]	—
			526/3076[4]	—
			874/3055[5]	—
	1	9500 (NGV)	226/3163	—

(1) Includes 150 lb. driver allowance.
(2) With 4.6L gas engine
(3) With 5.4L gas engine
(4) With 6.8L gas engine
(5) With 6.0L diesel engine

2004 E-SERIES VAN / CUTAWAY / CHASSIS CAB / STRIPPED CHASSIS

Model/Series	Payload Package	GVWR (lb)	138" WB. Max. Weights[1] Front/Total (lb)	158" WB. Max. Weights[1] Front/Total (lb)	176" WB. Max. Weights[1] Front/Total (lb)
E-350 Super Duty Cutaway	Q	9600	436/4474[2]	—	—
			487/4474[3]	—	—
			898/4516[4]	—	—
	T	10700	479/5445[2]	—	—
			493/5445[3]	—	—
			894/5454[4]	—	—
	T	11500	1017/919[5]	634/6100[2]	625/6156[2]
			—	656/6100[3]	645/6156[3]
			—	663/6109[4]	676/6165[4]
E-350 Super Duty Chassis Cab	T	10700	454/5369[2]	—	—
			468/5369[3]	—	—
			883/5389[4]	—	—
	T	11500	—	411/6024[2]	602/6091[2]
			—	432/6024[3]	617/6091[3]
			—	681/6044[4]	681/6100[4]
E-350 Super Duty Comm. Stripped Chassis	U	9600	261/5440[2]	277/5352[2]	—
			303/5454[3]	317/5366[3]	—
	W	10000	219/5571[2]	230/5500[2]	304/5464[2]
			260/5585[3]	270/5514[3]	348/5478[3]
	Z	11000	—	407/6500[2]	404/6464[2]
			—	447/6514[3]	448/6478[3]
E-450 Super Duty Cutaway	T	14050	—	228/8113[3]	198/8089[3]
			—	523/8012[4]	581/8054[4]
			—	291/8096[6]	265/7996[6]
E-450 Super Duty Chassis Cab	T	14050	—	211/8039[3]	202/8013[3]
			—	542/7937[4]	600/7979[4]
			—	444/8020[6]	281/7996[6]
E-450 Super Duty Comm. Stripped Chassis	T	14050	—	186/9302[2]	219/9307[2]
			—	94/9149[3]	127/9151[3]

(1) Includes 150 lb. driver allowance.
(2) With 5.4L gas engine
(3) With 6.8L gas engine
(4) With 6.0L diesel engine
(5) School Bus
(6) With 5.4L NGV

PAYLOAD/WEIGHT RATINGS

Option/Payload Worksheet

MAXIMUM ALLOWABLE WEIGHT (REGULAR PRODUCTION OPTIONS & AFTERMARKET EQUIPMENT WEIGHT) (LB)

			Engine				
Model/Series	**Wheelbase**	**GVWR (lb)**	**4.6L V-8**	**5.4L V-8**	**5.4L NGV V-8**	**6.8L V-10**	**6.0L V-8 Diesel**
E-150 Regular Van	138"	6700	871	783			
	138"	6700 (Crew)	709	694			
	138"	7000 (RV)	1033	1068			
E-250 Regular Van	138"	7200	757				
	138"	8600	737	644			
	138"	8600 (Crew)	617	524			
	138"	8600			604		
E-250 Extended Van	138"	7300	624				
	138"	8600	532	450			
	138"	8600 (Crew)	617	545			
E-350 SD Regular Van	138"	9500		1847	1012	1698	1850
	138"	9500 (Crew)		1621		1621	1600
E-350 SD Extended Van	138"	9250 (Crew)		1435		1296	
	138"	9300			867		
	138"	9400		1688		1549	1701
	138"	9400 (Crew)					1507
E-350 SD Cutaway	138"	9600 SRW		3699		3393	3741
	138"	10700 DRW		3570		3570	3579
	158"	11500		3425		3425	3434
	176"	11500		3481		3481	3490
	138"	11500 (School Bus)					919
E-450 SD Cutaway	158"	14050				2888	2787
	158"	14050 (NGV)			2871		
	176"	14050				2864	2904
	176"	14050 (NGV)			2771		
E-350 SD Chassis Cab	138"	10700		3494		3494	3514
	158"	11500		3349		3196	3369
	176"	11500		3416		3263	3425
E-450 SD Chassis Cab	158"	14050				2814	2712
	158"	14050 (NGV)			2795		
	176"	14050				2788	2829
	176"	14050 (NGV)			2771		
E-350 SD Commercial Stripped Chassis	138"	9600		4715		4729	
	138"	10000		4446		4460	
	158"	9600		4627		4641	
	158"	10000/11000		4375		4389	
	176"	10000/11000		4339		4353	
E-450 SD Commercial Stripped Chassis	158"	14050		3927		2774	
	176"	14050		3932		3776	

TABLE "B" — VEHICLE PAYLOAD CALCULATION

	Front/Total (lb)
Total Allowable Maximum Option Weight (from Table "A")	_____/_____
Less Total Actual Option Content Weight (from Line A) of the Option/Payload Worksheet	_____/_____
Equals Net Total Vehicle Payload. Front and rear axle and spring capacities will be sufficient to carry this payload uniformly distributed in vehicle cargo area.	_____/_____

PAYLOAD/WEIGHT RATINGS

Option/Payload Worksheet

Option Weight	(Front/ Total) (lb)
ENGINE/TRANSMISSION COMBINATIONS:	
5.4L (330) SEFI V-8 — w/4-Spd. Auto. OD (4R100)	(0/0)
6.8L (415) SEFI V-10 — w/4-Spd. Auto. OD (4R100)	(125/153)
6.0L (363) V-8 Turbo Diesel — w/5-Spd. Auto. OD (TorqShift™)	(603/691)
Limited Slip Rear Axle	(0/4)
TIRES (Add tire weight even if specified as standard equipment):	
LT225/75Rx16E (DRW)	(0/0)
LT245/75Rx16E (SRW)	(0/0)
TIRE EQUIPMENT:	
Spare Tire & Wheel Not Included	(-11/86)
Interior Spare Tire Kit	(-12/71)
PACKAGES:	
A/C Prep Package	(24/25)
Ambulance Prep Package	(2/2)
Auxiliary Heater & -Air Conditioning	(54/61)
Auxiliary Heater Prep Package	(5/9)
Exterior Upgrade Package	(3/7)
Heater & A/C Prep Package	(18/21)
Heater & A/C Prep Package w/rear controls	(17/22)
Interior Upgrade Package	(12/27)
Motorhome Prep Package	(2/2)
Power Equipment Group	(9/13)
Radio Prep (2 speakers)	(1/3)
Radio Prep (4 speakers)	(4/6)
Radio Prep (6 speakers)	(6/9)
School Bus Body Builder Prep Package	(2/2)
Seat Prep Package - Power	(21/-35)
Shuttle Bus Prep Package	(2/2)
Trailer Towing (Class I)	(1/2)
Trailer Towing (Class II/III/IV)	(1/2)
Sub-Total: Front/Total	____/____
OPTIONS:	
Air Bag, Passenger Delete (LPO)	(-9/-11)
A/C - Delete	(-51/-49)
Alternator, Dual	(21/20)
Battery, Heavy-Duty/Auxiliary	(37/67)
Bumper, Painted Front	(65/61)
License Plate Bracket, Front	(1/1)
Bumper, Chrome	(5/4)
Captain's Chairs, Dual w/o Trim	(3/4)
Carpeting - Front only	(2/2)
Deluxe Engine Cover Console - Delete	(-9/-11)
Door, RH Not Included	(-53/-84)
Engine Cover Console - Slim	(-2/-3)
Floor Mats, Front (Gas)	(9/13)
Floor Mats, Front (Diesel)	(14/18)
Frame Pucks	(3/6)
Front GAWR, One Up	(2/2)

Option Weight	(Front/ Total) (lb)
Fuel Tank, 55 Gallon	(-9/63)
Fuel Tank, Transit Plastic Not Included	(3/8)
Heater, Engine Block	(1/1)
Idle Kit, Auxiliary	(4/4)
License Plate Bracket, Front	(1/1)
Mirror, Interior Day/Night	(1/1)
Mirrors, Base Exterior	(7/8)
Mirrors, Trailer Tow - Manual	(15/20)
Mirrors, Trailer Tow - Power	(14/21)
Modified Vehicle Wiring Kit Delete	(-1/-1)
Paint, Clearcoat	(1/1)
Radio, AM/FM Stereo/Cassette	(3/3)
Radio, Premium Plus CDX-6	(5/6)
Radio, Delete	(-3/-4)
Running Boards	(13/27)
Seat, Power Driver's	(7/11)
Spacers, Standard Pattern Frame, Not Included (138″ WB)	(8/129)
Spacers, Standard Pattern Frame, Not Included (158″ WB)	(8/129)
Spacers, Standard Pattern Frame, Not Included (176″ WB)	(44/147)
Spacers, Alternate Pattern Frame (138″ WB)	(-2/165)
Spacers, Alternate Pattern Frame (158″ WB)	(25/165)
Spacers, Alternate Pattern Frame (176″ WB)	(42/165)
Speed Control	(2/2)
Wheels, 16" x 7" Forged Aluminum	(-32/-68)
Sub-Total: Front/Total	____/____
Plus Sub-Total: From 1st Column	____/____
(Line A) Total Actual Option Content Weight: Front/Total	____/____

E-SERIES CUTAWAY, CHASSIS CAB & COMMERCIAL STRIPPED CHASSIS

BASE CURB WEIGHTS

Model / Series		Wheelbase	GVWR	Curb Weight Front (lb)	Rear (lb)	Total (lb)
E-150	Regular Van	138	6700	2769	2065	4834
		138	6700 (Crew Van)	2954	2107	5061
		138	7000 (Conv. Van)	2741	2051	4792
E-250	Regular Van	138	7200	2871	2275	5146
		138	8600	2877	2289	5166
		138	8600 (Crew Van)	3068	2350	5418
		138	8600 (NGV)	2887	2936	5823
	Extended Van	138	7300	2768	2511	5279
		138	8600	2821	2550	5371
		138	8600 (Crew Van)	3073	2345	5418
E-350 Super Duty	Regular Van	138	9500	3032	2391	5423
		138	9500 (Crew Van)	3206	2443	5649
		138	9500 (NGV)	3000	3012	6012
	Extended Van	138	9400	2944	2638	5582
		138	9250 (Crew Van)	3132	2703	5835
		138	9300 (NGV)	2906	3251	6157
	Cutaway	138 SRW	9600	2892	1909	4801
		138 DRW	10700	2906	2024	4930
		158	11500	2984	2091	5075
		176	11500	3020	1999	5019
		138 DRW(1)	11500	3384	2104	5488
	Chassis Cab	138	10700	2937	2069	5006
		158	11500	3019	2132	5151
		176	11500	3049	2035	5084
	Commercial Stripped Chassis	138 SRW	9600	2163	1822	3985
		138 DRW	10000	2172	2082	4254
		158 SRW	9600	2272	1801	4073
		158 DRW	10000 / 11000	2284	2041	4325
		176	10000 / 11000	2281	2080	4361
E-450 Super Duty	Cutaway	158	14050	3082	2530	5612
		158	14050 (NGV)	3050	2579	5629
		176	14050	3154	2482	5636
		176	14050 (NGV)	3090	2639	5729
	Chassis Cab	158	14050	3116	2570	5686
		158	14050 (NGV)	2918	2787	5705
		176	14050	3194	2518	5712
		176	14050 (NGV)	3090	2639	2729
	Commercial Stripped Chassis	158	14050	2263	2310	4573
		176	14050	2321	2247	4568

(1) School Bus.

SPECIAL APPLICATIONS

Trailer Towing Information

NOTE: Refer to the TRAILER TOWING SECTION in this book.

Snow Plow Information

NOTE: Not recommended for Snow Plow Applications.

ElDorado National

a THOR company

MANUFACTURER'S LIMITED WARRANTY

FOR THE AERO PRODUCT LINE

ELDORADO NATIONAL (KANSAS), INC. (hereinafter sometimes referred to as "ENC"), warrants each new product (excepting the "Body Structure" as herein defined) for a period of one (1) full year after the initial date of retail purchase, or for twelve thousand (12,000) miles, whichever occurs first, after the actual date of purchase by the product's first owner, and agrees to repair any defective part subject to the items and limitations of this warranty agreement.

ENC warrants the "Body Structure" for five (5) years or one hundred thousand (100,000) miles, whichever occurs first, from the date of delivery to the product's first owner.

"Body Structure" is defined as all exterior "FRP Honeycomb" panels and does not include any part of the automotive chassis as prepared by the automotive manufacturer. Items not considered body structure include (but are not limited to) the following:

- Doors
- Windows
- Roof vents
- Gel coat crack
- Paint
- Interior wall covering panels
- Bumpers
- Rub rail guards

LIMITATIONS

- ENC retains the option to repair or replace.
- ENC requires that all repairs performed under the terms of its limited warranty must be done at one of ENC's factories or at one of ENC's authorized service centers. In the event that this requirement presents an undue hardship on the owner, ENC requires that the owner call the ENC factory service and warranty manager and secure approval for the repair work to be done at a qualified repair station whose qualifications are mutually agreed upon by both the factory service manager and the owner.
- ENC requires that all warranty work performed under the terms of this limited warranty that exceeds one hundred dollars ($100.00) in value of parts and labor combined must be approved by the ENC warranty manager before the warranty work is performed. The ENC warranty manager is located at Salina, Kansas (Phone 800-955-9086).
- If the product has been previously used in dealer demonstration service beyond four thousand (4,000) miles/one (1) year, or as a dealer rental unit, the time used and the mileage accrued in the previous service above four thousand (4,000) miles/one (1) year is counted toward the twelve thousand (12,000) miles limit, and one (1) year's warranty, or in the case of the body structure, one hundred thousand (100,000) miles or five (5) year's warranty.
- ENC retains the right under the terms of its limited warranty to void its limited warranty due to any of the following items listed as exclusions:
  - Damage to product caused by an accident involving the vehicle
  - Product failure caused by improper servicing
  - Product failure caused by customer negligence
  - Product failure caused by customer misuse
  - Damage or product failure caused by freezing, flooding, fire, or any occurrences that may be termed an "Act of God."

- Many component parts of the ENC product are warranted by the manufacturer of these component parts, and therefore are not covered by ENC's limited warranty. The list of items not covered by ENC's limited warranty includes (but is not limited to) the following:

  - Automotive chassis as received from the chassis manufacturer
  - Wheelchair lifts and lock assemblies
  - Automotive air conditioners and heaters
  - Tires
  - Batteries
  - Air conditioners/heaters
  - Toilets
  - Automotive cruise controls
  - Audio systems
  - Tag-axle suspension systems
  - Alternators and regulators

The manufacturer of these specific component parts offer a national network of service centers fully qualified to handle customer service problems.

- ENC does not undertake responsibility for normal maintenance items, adjustments past thirty (30) days (door adjustment, etc.) and any dealer, service center, or owner installation of equipment.

- ENC does not undertake responsibility to any purchaser of its products for any undertaking, representation or warranty made by dealers selling its products beyond those herein expressed.

- ENC does not assume responsibility for loss of use of the vehicle, loss of time, inconvenience, expense for gasoline, towing, telephone, travel, lodging, loss or damage to personal property or loss of revenues or the cost of a replacement rental vehicle.

- ENC's limited warranty as stated herein and any implied warranties that may be expressed by ENC are limited to one (1) full year, or twelve thousand (12,000) miles, whichever occurs first, after the actual date of delivery by the vehicle's first owner. Body structure as defined herein is limited to five (5) years or one hundred thousand (100,000) miles, whichever occurs first. The limited warranty extends to the original retail purchaser only is not transferable. Original purchase means the first retail purchaser purchasing the ENC product from an ENC dealer.

- ENC limited warranty is applicable to any product registered and normally used within the United States and Canada only.

With the exception of "body structure" as defined herein, which has a different stated warranty, the limited warranty applicable to your product is for the duration of twelve thousand (12,000) miles or for the duration of one (1) full year after the initial date of retail purchase, whichever occurs first. ENC is required by law to maintain records pertaining to the ultimate owner of each ENC product. It is desirable for the warranty starting date to be registered properly at the ENC factory within ten (10) days after the purchase date. A warranty registration card is enclosed with each new product owner's manual package. The selling dealer should send this registration card to the factory at the time of your purchase. The absence of this registration in no way changes your limited warranty. However, proof of date of purchase may be required at some future date should you need service attention under the terms of the limited warranty.

Both ENC and the automobile company that manufactured the chassis portion of the ENC product will extend the mileage limit if that mileage has been used in delivering the vehicle from the factory to the dealer location.

ENC's limited warranty is expressly limited to material and workmanship defects as stated herein unless applicable state laws provide otherwise. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion of limitation of incidental or consequential damages, so these limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. Besides provisions stated herein, the product owner should also make themselves aware of the legal remedies available under the Magnuson-Moss Act.

This warranty is effective for ENC products manufactured after July 1, 2000.

Transit Agency Address/Phone Numbers

Lenawee

Ms. Marcia Bohannon
Adrian Dial-A-Ride
100 E. Church Street
Adrian, MI 49221

Telephone No. (517) 264-4849 Fax No. (517) 265-8133
E-Mail Address: adrianta@a1access.net

Oakland

Agency on Aging 1-B

Telephone No. Fax No.
E-Mail Address:

Alcona

Alger-Marquette CAB

Telephone No. Fax No.
E-Mail Address:

Allegan

Mr. Daniel Wedge
Allegan County - Transportation Services
3255 122nd Avenue
Allegan, MI 49010

Telephone No. (269) 686-4529 Fax No. (269) 673-4172
E-Mail Address: dwedge@allegancounty.org

Allegan

Mr. Jim Madsen
Allegan County CMH
3120 Babylon Rd.
Allegan, MI 49010

Telephone No. (269) 673-3400 Fax No. (269) 673-3369
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Allegan

Mr. Edward Hillary
Allegan County Resource Development Committee
323 Water Street
Allegan, MI 49010

Telephone No. (269) 673-5472 Fax No. (269) 673-3795
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01/08/2004

Transit Agency Address/Phone Numbers

Gratiot

Mr. Randy Sumner
Alma Dial-A-Ride
City of Alma Transit Center, PO Box 278
Alma, MI 48801-0278

Telephone No. 989 463-6016 Fax No. 989 466-5307
E-Mail Address: rsumner@ci.alma.mi.us

Alpena

Mr. Greg Sundin
Alpena, City of
208 North First
Alpena, MI 49707

Telephone No. 989 354-4158 Fax No. 989 354-4585
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Alger

Ms. Rochelle Cotey
ALTRAN Transit Authority
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Munising, MI 49862

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Kent

Ms Lisa Marks
American Red Cross Of West Central Michigan
1050 Fuller NE
Grand Rapids, MI 49503

Telephone No. (616) 456-8661 Fax No. (616) 235-2355
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Washtenaw

Mr. Gregory Cook
Ann Arbor Transportation Authority
2700 S. Industrial Hwy.
Ann Arbor, MI 48104

Telephone No. (734) 973-6500 Fax No. (734) 973-6338
E-Mail Address: cwhite@theride.org

Antrim

Mr. Robert Straw
Antrim County Transportation
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Bellaire, MI 49615

Telephone No. (231) 533-8644 Fax No. (231) 533-8504
E-Mail Address: act@torchlake.com

Transit Agency Address/Phone Numbers

St. Joseph

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Wayne

Mr. Jim McGuire
Area Agency on Aging Region 1-B
400 Franklin Center, 29100
Northwestern Highway
Southfield, MI 48034

Telephone No. (313) 569-0333 Fax No.
E-Mail Address:

Kent

Ms Beverly Drake
Area Community Service Employ. and Trng.
215 Straight St N.W.
Grand Rapids, MI 49504

Telephone No. 616 336-4104 Fax No. 616-336-4193
E-Mail Address: pattokg@nwd.org

Arenac

Ms. Elaine Koin
Arenac Opportunities, Inc.
4358 Airpark Drive PO Box 512
Standish, MI 48658

Telephone No. 989 846-4441 Fax No. 989 846-2137
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Arenac

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Houghton

Mr. Jerry Jackovac
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01/08/2004

Transit Agency Address/Phone Numbers

Baraga

Ms. Pamela Anderson
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Six North Main Street
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Barry

Mr. Joseph Bleam
Barry County Transit
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Calhoun

Mr. Jerry Hutchison
Battle Creek Transit
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Battle Creek, MI 49017

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Grand Traverse

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